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A SUITABLE SUBSTRATE FOR THE DETERMINATION OF PANCREATIC LIPASE IN SERUM AND OTHER BODY FLUIDS*

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A reliable test for the presence of lipase of pancreatic origin in human serum and other body fluids would appear to be of great value to the clinician. Unfortunately, procedures in general use have not always given satisfactory results. This study has been undertaken to discover the underlying factors which are responsible for erratic results and to eliminate them if possible.

It is generally agreed that olive oil is the best substrate for the determination of pancreatic lipase activity. One may assume that a stable emulsion of olive oil which does not readily break down into an oil layer and a water layer, or a constantly agitated mixture of olive oil and enzyme material, would give the most satisfactory results. In either case the enzyme would be kept in contact with finely divided olive oil droplets.

None of the emulsions which we shall consider here is free of the tendency to layer out into oil and water layers if allowed to stand for a short time without agitation. In this study we have considered ways of overcoming this difficulty in order to insure the best possible contact between oil and enzyme and to determine to what extent the layering out affects the end result of the incubation. In general the more active the enzyme being tested the more quickly the layering out process takes place, so that frequent shaking is necessary to maintain a fairly homogeneous mixture. Of course, the ultimate test in this connection would be one in which the oil-enzyme mixture could be kept constantly agitated for the duration of the incubation period. For this purpose we used a small wind motor with stirring rod attachment

* First Award A.S.M.T. Convention, June, 1948.

fitted to the tube containing the enzyme-substrate mixture.

Several olive oil emulsions were found to give satisfactory results if suitable conditions were maintained for their use. The emulsion proposed by Goldstein and Roe[1] using a specially prepared glycerol oxbile emulsifying reagent as prepared by Balls, Mattack and Tucker[2] and a veronal buffer at pH 8.9 is readily responsive to lipase activity. The glycerol oxbile emulsifying reagent is somewhat tedious to prepare; but it keeps well and may be made in a large quantity and kept for use as needed. The chief drawback to its use is the greenish color of the emulsifying reagent which gives a yellow-green color to the emulsion. This color somewhat obscures the phenolphthalein end point of the titration. Goldstein and Roe have determined the optimal pH for lipase activity to be between 7.5 and 9.2. Veronal buffer, therefore, offers a range suitable for the test.

The 50% emulsion of olive oil proposed by Cherry and Crandall,[3] using gum acacia as the emulsifying reagent, has been widely used with variable results. One objection to its use, though a minor one, is the difficulty of making exact measurements because it is too thick to pour or pipette readily. When freshly prepared, it is quite satisfactory but with aging it becomes less and less useful, due to a shift in pH from alkaline to acid. Even when freshly prepared, and at maximal alkalinity, its pH is at the lower limit of lipase activity, being in the neighborhood of 7.0.

With the good and bad points of the above-described substrates in mind we attempted to produce a mixture that would embody the good features and eliminate the bad. Accordingly, we used the sodium salt of cholic or desoxycholic acid as the emulsifying agent. The emulsion was pure creamy white in color, of good consistency for accurate measurement and was readily responsive to enzyme activity. It was easily and quickly prepared, so that a fresh supply with optimal pH could always be available. With this emulsion we used the veronal buffer of Goldstein and Roe to insure a substrate within the most active range of lipase activity.

For studies of activity, pH, buffers and timing an active enzyme was necessary. The one used in these studies was prepared by suspending 1 gm. of desiccated pancreas in 17ml. of 87% glycerol.[2] From this stock suspension, dilutions were made as desired. Using dilutions of 1 to 10, 1 to 20, or 1 to 50 of this suspension, we made studies to determine how quickly lipase activity could be demonstrated, how long the speed of activity was maintained and when if ever it reached the limit of activity.

For these investigations a series of ten tubes each containing 5 ml. of olive oil emulsion and 3.0 ml. of veronal buffer were

placed in the water bath at 37.5° Centigrade for five minutes. To each tube was then added 1 ml. of the enzyme dilution selected. At intervals timed exactly, from 10 minutes to 18 hours, the tubes were removed from the water bath, the pH of the mixture was determined, and the enzyme activity was stopped by the addition of 10 ml. of 95% alcohol. The contents of the tube was then titrated with N/10 KOH, with phenolphthalein as an indicator and the value recorded. From several such series of tests it was observed that lipase activity began at once, were most rapid in the first half hour and continued at a retarded rate as long as enzyme and substrate were in contact. It was noted that approximately one third of the total 18 hour value was obtained at the two hour interval. In three to four hours over one half of the total activity had taken place.

These studies revealed, also, something of the self-limiting nature of lipase activity. It was noted that the pH dropped steadily during incubation. The initial pH of 8.5 quickly dropped to 7.8 at the fifteen minute interval and continued downward to 6.5 at six hours and 6.0 at eighteen hours. This drop in pH probably accounted for the gradual slowing of the activity of the enzyme. Another factor in the slowing process was, doubtless, the reduction of available olive oil to be acted upon.

Because of these observations it seemed advisable, for clinical purposes, to use such dilutions of the enzyme material as to limit the pH changes over an eighteen hour incubation period to those between 8.5 and 7.2. In case a further reduction in pH does occur, the test should be repeated with a greater dilution. Of course, the studies made as recorded above utilized a highly active enzyme material and, therefore, the observations made were of a higher order than would be expected in blood serum. Since the substrate and buffer were adequate under these exaggerated conditions, it may be assumed that they will meet the most unusual lipase activity to be found in serum or other body fluids.

The tendency of the substrate to layer out into an oil and a water layer was most apparent when a highly active enzyme was being used, as in the case of the studies just recorded. In order to determine the effect of such separation upon lipase activity, a series of tubes was set up. Each contained exactly the same quantity of enzyme material, buffer and olive oil emulsion. One half of these was stirred continuously while the other half was mixed only occasionally over an eighteen hour interval. It was found that those mixtures continuously stirred showed a consistant slight increase in titration over the unstirred ones. This observation indicated that the better contact between enzyme and olive oil particles, ensured by constant stirring, favored greater activity of the enzyme. The importance of this observa-

tion is, however, more theoretic than actual. Since the conditions of the test may be arbitrarily set, both as to timing and mixing, normal values are established according to the conditions set. Comparisons are valid, even though the absolute values may not be indicated.

Therefore, the test for lipase in serum or other body fluids may be stated as follows.

Procedure

Blood—To 1 ml. of serum in a test tube add 2 ml. of olive oil emulsion and 0.8 ml. of veronal buffer. Mix well and incubate in a water bath at 37.5° C. for 18 hours with occasional shaking. At the conclusion of the incubation period add 0.5 ml. of a 1% solution of phenolphthalein in alcohol and 5 ml. of 95% alcohol. Titrate with 0.1 N KOH (alcoholic) (aqueous 0.1 N KOH or NaOH may be used) to the first definite lasting pink color of the indicator. Subtract the blank titration (below). Report the number of milliliters of 0.1 N KOH required for 1 ml. of serum. Normal values are from 0-0.3 ml. of 0.1 KOH.

For the blank, dilute 1 ml. of serum in a test tube with 2 ml. of water. Heat at 75° C. for five minutes to inactivate the enzyme. Add to the inactivated serum 2 ml. of olive oil emulsion and 0.8 ml. of veronal buffer solution. Incubate in a water bath at 37.5° C. for 18 hours with occasional shaking and titrate.

Duodenal contents—Dilute 1 ml. of duodenal fluid to 100 ml. Add 1 ml. of the diluted duodenal fluid to 5 ml. of emulsion and 2 ml. of buffer in a 20 x 180 mm. test tube. Incubate 2 hours at 37-40° C., shaking about every 15 minutes. Add 10 ml. of 95% alcohol and titrate with 0.1 N alcoholic KOH (see note above). For the blank, inactivate 1 ml. of the diluted fluid by heating at 75° C. or above for 5 minutes.

If the titer is more than 7 ml. of 0.1 N KOH make a further dilution of the duodenal fluid and repeat. It is well to test the pH of the digestion mixture before dilution with alcohol. If the pH is less than 7.2 the determination should be repeated with a greater dilution, since the optimal pH is about 7.8.

Reagents

Sodium desoxycholate (or cholate)—Suspend 2 grams of desoxycholic acid (or cholic acid) in water, add 2 drops of phenolphthalein indicator and add with stirring small amounts of 0.1 N NaOH until the solid dissolves and the solution remains slightly alkaline to phenolphthalein. Dilute to 100 ml. with water.

Olive oil emulsion—Wash a pharmaceutical grade of olive oil (100 ml.) once with thorough shaking in a separatory funnel, with 100 ml. of 0.5% sodium bicarbonate and then twice with

water. To 25 ml. of washed olive oil add 75 ml. of sodium desoxycholate, or cholate, and 2 drops of phenolphthalein. Add, with stirring, 0.1 N NaOH a little at a time until the mixture remains faintly pink. Put through the hand homogenizer (Central Scientific Co. No. 70180) and store in the ice box. Keep fresh by making enough to last a week or 10 days.

Veronal buffer—Dissolve 10 grams of sodium diethylbarbiturate in 1 liter of water.

Summary—An olive oil emulsion for use in the determination of pancreatic lipase in blood and other body fluids is proposed. A method for use in the laboratory is suggested.

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DRY CELLOIDIN TECHNIQUE AS ADAPTED TO THE PREPARATION OF EYE TISSUE*

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* Read before A.S.M.T. Convention, June, 1948.

Celloidin has been used for embedding since 1879 when Duval first published his method in the Journal of Anatomy.[1] In reviewing the various techniques that have been developed over the years, three outstanding advantages of celloidin over other embedding methods become apparent. These are: (1) Shrinkage and distortion of the block of tissue is greatly minimized; (2) Minute details in cellular structure are more completely preserved; (3) Loose membranes and fragile or brittle areas (lens) in the tissue are more easily kept intact.

The dry celloidin method[2] has been found preferable to the wet technique for soft tissues. Blocks embedded in this manner may be sectioned on either rotary or sliding microtomes, and thinner sections may be obtained. Serial sections may be laid out on the work bench for several hours without drying.

The purpose of this paper is to give in detail the modified dry celloidin technique as developed by Lawrence P. Ambrogi at the Army Institute of Pathology for fixing, dehydrating, sectioning and staining of eyes. (The method is included in a chapter by Ambrogi and Wilder, in the second edition of "The Eye and Its Diseases," edited by Conrad Berens, now in press.)

Because of the very rapid postmortem degeneration which occurs within the retina, particularly in the region of the macula, the necessity for placing the eye in fixative as soon as possible after enucleation cannot be over emphasized. Intraocular new growths can usually be identified by transillumination after formalin fixation; however, many other fixatives tend to render the eye so opaque that transillumination is impossible. Discoloration, particularly by dichromate and picric acid, may mask external as well as internal lesions. Thus when fixatives other than formalin are used the location of tumors and scars should be clearly marked with India ink or suture. Such markings are also important in orientation of the eyeball.

Formalin is a satisfactory fixative for eyes, although Zenker's solution is a better preservative for the retina and choroid, giving excellent cellular detail, especially of rods and cones. Formalin has the advantages of not being subject to rapid deterioration and of requiring no special handling. Specimens can be kept in it indefinitely without damage to their staining properties, pro-

* Paper presented at meeting of the American Society of Medical Technologists, St. Paul, Minnesota, June 7-9, 1948.

vided the pH is held at about 7.0. It does not destroy color as do fixatives containing chromium, mercury, or picric acid. For these reasons the Army Institute of Pathology has recommended it as the routine fixative for eyes. A 10 per cent solution of formalin made either with distilled water or an 0.8 per cent solution of sodium chloride is used. That this preparation is slightly acid in no way interferes with its effectiveness; nevertheless some technicians prefer to neutralize it with magnesium carbonate. Formalin should be used in volumes 20 times greater than that of the specimen, that is, 300 cc. for one eye.

If fixation has been carried out according to the suggested procedure, it is possible to continue immediately with subsequent steps in the technique.

Eyes showing lesions of certain types, such as phthisis bulbi or injuries, can be and frequently are processed by the paraffin method. In cases of intraocular tumor and sympathetic ophthalmia the specimens are opened, a small segment through the diseased area is removed and processed in paraffin for preliminary diagnosis, while the main block is embedded in celloidin for further study and confirmatory diagnosis.

Four definite stages make up the celloidin technique, namely:

(1) Complete dehydration in a celloidin solvent.
(2) Infiltration of the tissue with increasing concentration of celloidin—
    a. At room temperature
    b. Under pressure, at 50° - 60° C.
    (this is known as the "hot celloidin method")
(3) Embedding in concentrated celloidin by controlled evaporation of the solvent.
(4) Hardening of the block to obtain adequate rigidity for sectioning.

Upon being received at the Army Institute of Pathology the eyes are washed in running water from 24 to 48 hours to insure the removal of all formalin. They are then placed in 60 per cent alcohol to await gross examination, recording of description, and sectioning for embedding.

The technique recommended at the Institute calls for placement of the eyes in a solution of from 1 to 2 per cent hydrochloric acid, commercial or C. P. (about 35 per cent), in 50 per cent alcohol.[3] This treatment is suggested to assist in prevention of detachment of the retina, as well as to aid penetration of the cornea and sclera by the embedding medium. It has been found, however, that since our specimens are subjected to rough handling in shipping, they frequently arrive with detachment already evident. Therefore this step may be eliminated without further damage to the structures and without material change in the process of penetration of the embedding medium.

After the gross description and sectioning has been completed the segment for examination is cut and placed in 60 per cent alcohol. If calcium or bone is detected when the eye is bisected, the block must be decalcified. This entails rewashing in water to remove all traces of alcohol, and suspending in equal parts of 10 per cent formalin and 88 percent formic acid for several days, the number depending upon the density of the calcific material found. The specimen next is washed in running water for several hours to remove all excess acid, then it is placed in 10 per cent formalin over magnesium carbonate for at least 24 hours. After washing in water again and placing in 60 per cent alcohol, the technique is continued as with undecalcified eyes.

Each segment to be embedded is tagged with its own accession number; thereby it is possible to process numerous eyes together, using ordinary canning jars of quart or pint size. The process of dehydration is accomplished by transferring the specimens (usually sixteen at a time) through a series of quart jars containing 80 per cent alcohol, 95 per cent alcohol, absolute alcohol, and absolute alcohol and ether (equal parts). The time required in each solution to assure complete penetration and subsequent complete dehydration is about 24 hours.

Next the eyes are placed in thin celloidin (4 gm. celloidin in 100 cc. absolute alcohol and ether, equal parts) for at least 1 week, or longer if circumstances require. They may be left in this solution indefinitely if the jar is tightly sealed to prevent evaporation of the celloidin solvent. (When time and the number of eyes being processed will permit, it is advisable to impregnate the tissues using ascending percentages of celloidin—2%, 4%, 6%, and 10%—allowing the tissues to remain in each solution approximately two days. This procedure assures better penetration of the tissue than does the direct transfer from thin to thick celloidin).

When ready to embed, the eye blocks with the desired surface up are placed close to the bottom of Stender dishes containing thick celloidin (12 per cent solution). It is essential to embed with as little handling as possible so as to avoid creating air bubbles, which if allowed to persist throughout the rest of the procedure will give rise to difficulties. The Stender dishes are placed under a sealed bell jar until all of the air bubbles have disappeared, generally from 4 to 6 days, then they are removed from the bell jar and their covers loosely applied to allow gradual hardening of the celloidin by evaporation of the alcohol-ether solvent. Hardening usually takes several days, but a careful check should be made every day to ascertain whether the celloidin has attained the proper consistency, that is, when the eye blocks have become firm enough to be easily cut and removed.

With the same surface down, the blocks are trimmed and affixed with thin celloidin to wood or fiber blocks, keeping the amount of celloidin between the tissue and the block at a minimum in order to reduce vibration at the time of cutting. They are then placed in chloroform vapor for 2 hours to harden. The blocks next are placed in equal parts of cedar wood oil and chloroform for 24 hours, and in cedar wood oil (3 parts) and chloroform (1 part) for another 24 hours. For clearing and storing they are placed in cedar wood oil until ready to cut (a period of 24 hours or longer).

In sectioning, the block is cut parallel to the knife edge, as is a paraffin block. The sections are washed in two changes of 95 per cent alcohol to remove the cedar wood oil.

Sufficient sections are made at the original cutting to allow for filing of extra sets for possible future use, in addition to those required for routine examinations. Sections selected for staining are sketched for later identification and are placed in 80 per cent alcohol until ready to stain. The extra sections are floated on squares of blotting paper and stored with the remaining part of the block in 80 per cent alcohol.

The sections for staining are selected for their ability to demonstrate the features noted by the pathologist in his original description. If he has cut the main segment with dexterity, and the technician has followed the sectioning with care, it is possible to obtain sections which show all of the characteristic features of the particular specimen, including the pupil and the central vessel of the optic nerve as well as the specific lesion. There are times, however, when because of the type of disease or abnormality, sections from several levels must be stained to complete the picture.

For routine sections the familiar hematoxylin and eosin staining procedure is followed, which calls for all sections to be—

1. Rinsed thoroughly through 2 changes of 95 per cent alcohol to assure removal of any traces of cedar wood oil.
2. Floated in tap water for several minutes.
3. Stained in Harris' hematoxylin[4] for 15 minutes.
4. Washed in several changes of water. (If it becomes necessary to pause in the procedure the sections may be left in distilled water at this point for as long as an hour.)
5. Differentiated in acid alcohol (½ per cent hydrochloric acid in 70 per cent alcohol); check under microscope for sharpness of staining of nuclei in cells.
6. Washed in 95 per cent alcohol (2 changes).
7. Blued in ammonia water (10 drops of ammonium hydroxide in a large staining dish of water).
8. Washed in distilled water.

9. Counter-stained in eosin (1 part of 1 per cent stock, to 3 parts 80 per cent alcohol).
10. Washed in 95 per cent alcohol (2 changes).
11. Cleared in carbol-xylol (1 part phenol crystals to 3 parts xylol).
12. Rinsed in xylol.
13. Mounted in Canada balsam.

Certain special staining techniques have been adapted for use on the celloidin material, but care must be exercised in handling because of the fragility of sections and the affinity of celloidin for certain dyes. In most of the special techniques caution must be used to prevent the settling of precipitates on the section, which may cause misinterpretation of the results.

The Wilder Reticulum Stain[5] has been most successfully used for study of fiber content of tumors, particularly as a means of classification of melanomas of the choroid. Reticulum is stained black; collagen, various shades of red.

MacCallum's Stain for Bacteria[4, 6] is effective for most bacteria. Gram-positive organisms are deep blue; gram-negative organisms red; fibrin blue.

Verhoeff's and Fisher's Bleach of Pigmented Tissues[7] bleaches melanin, distinguishing it from iron, making possible the identification of melanoma, old hemorrhage, and siderosis bulbi.

Mallory's Iron Reaction[4, 8] stains iron pigment an intense blue, thereby distinguishing it from melanin.

Masson's Trichrome Stain[6] is a connective tissue stain for the differentiation of tumor types, in which nuclei are black, muscle tissue is red, and collagen is blue.

Verheoff's Elastic Tissue Stain[4] shows elastic fibers which are stained an intense blue-black to black; nuclei blue to black; and collagen red; while other tissue elements become yellow after use of van Gieson's as a counter stain.

McMannus' Periodic Acid[9] modification of the Feulgen reaction as enlarged and altered at the Army Institute of Pathology, has proved most satisfactory in staining mucin and connective tissue, which become a bluish-red against a yellowish background.

Where complete and comprehensive results are desired and speed of preparation is not the prime consideration, the dry celloidin technique as adapted to the preparation of eye tissue will be found highly satisfactory. Slides prepared in this manner are excellent for diagnostic purposes, and also for demonstration and teaching.

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(Continued on Page J)

GASTRIC ASPIRATION TECHNIQUE*

A guide to obtaining specimens for bacteriological study.

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The value of gastric aspiration culture in the control of tuberculosis has been emphasized in a earlier article.[1] Vincent and Birge have shown that tubercle bacilli left in gastric juice at room temperature for twenty-four hours begin to deteriorate and may not grow on culture.[2] A larger percentage of positives is cultured where conditions permit gastric specimens to be seeded promptly. The delay occasioned by sending materials through the mail brings a greater proportion of false negative reports. In most modern hospitals the bacteriology departments are already equipped to make TB cultures and for those that are not so equipped, the necessary supplies and instruments are not too difficult to obtain. Therefore, for an effective program of tuberculosis control based on culture of gastric specimens, it becomes obvious that not only are properly equipped and staffed laboratories necessary, but also medical workers (including medical technologists) in the same locality who are skilled in aspiration technique. We are presenting a procedure here which we believe causes the patient a minimum of discomfort and by which one obtains an adequate specimen.

When the appointment for a gastric is made with the patient, he is instructed not to eat or drink anything after midnight the evening before his test. The aspiration is done the following morning as soon as the laboratory opens. Specimens collected on two or three successive mornings give a more dependable culture report than a single specimen.

The following equipment is needed:

1. Levine tube (size 16 for adults and size 14 for children and small adults).
2. Medicine glass.
3. Unassembled 20 cc. syringe.
   The tube, medicine glass and syringe are wrapped in a cloth towel which is placed in a brown paper sack and autoclaved.
4. Two or three ounce bottle of sterile glycerine.
5. Powdered "Caroid"[3] one part by volume suspended in sterile glycerine two parts, and sterile saline five parts.
6. Flask of sterile saline.

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* Read before ASMT Convention, June, 1948

7. Procaine hydrochloride solution and sterile applicator swabs.
8. Sterile drinking glass.
9. Sterile 50 cc. stoppered "Pyrex" centrifuge tubes with constricted neck into which fits size 0-0 rubber stopper.
10. "Kleenex" or other paper tissues.
11. Plastic or rubber apron to protect the patient's lap.

The patient is seated facing the light. He is informed the operation will not be painful. We have him swallow a small amount of powdered "Cariod" suspension, followed by a couple of mouthfuls of water from the hot faucet. The "Caroid" is a potent proteolytic enzyme used as a mucosolvent which facilitates the flow of gastric specimen through the tube. Bacteria and cells are not destroyed by the digestant.

The Levine tube is dipped into sterile glycerine and inserted into the larger nasal opening. The tube is held at the level of the patient's palate while the latter takes two or three deep breaths. This pause re-assures him he is not going to suffocate and helps him overcome the gag reflex. Then we push the tube gently down three inches at a time, pausing to allow deep breathing. In estimating when the tube has entered the stomach, we are guided by knowledge of the stature, build and age of the patient. The taller, longer-waisted and older individual needs more tubing.

About one person in three will have a congested or obstructed nose which does not admit a gastric tube. We instruct these individuals to open the mouth and to point the tongue out and down in front of the chin as far as possible, while we deftly insert the tube back of the tongue. The patient will gag more, but otherwise the operation procedes much as if done through the nose. We always insist on the patient's taking frequent deep breaths through the mouth. The patient with a hypersensitive throat should have it sprayed or swabbed with procaine hydrochloride before passing the tube.

When the Levine tube has reached the stomach, we have ready 5 cc. of sterile saline in a sterile 20 cc. syringe. The latter is attached to the tube and the saline injected to clear the openings. Then as much stomach juice as can be aspirated is transferred to the 50 cc. centrifuge tubes. Small injections of saline, air or "Caroid" are used as needed to facilitate the aspiration. Usually we collect from two to six ounces of gastric juice mixed with saline.

The average patient will overcome his dread of a gastric aspiration after having his first one.

Gastric samples which cannot be cultured promptly should be stored in the refrigerator to retard bacteriolytic action of human digestive enzymes.

The soiled Levine tube and syringe are washed in strong soap solution, autoclaved, rinsed in tap water and distilled water, dried, wrapped and re-autoclaved before the next using.

A description of a successful technique for gastric aspiration has been presented. Such a description is not a perfect substitute for experience, but a medical technologist or a nurse should be able to adapt or improve its ideas in the course of her own experience.

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ENTEROBIUS VERMICULARIS, HUMAN PINWORM*

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Enterobius vermicularis, the human pinworm or seat worm, is an intestine inhabiting round worm of adults and, more commonly, children. This paper does not relate any new research material, but emphasizes the morphology, diagnosis and distribution of pinworms. Enterobiasis or oxyuriasis is cosmopolitan in distribution. It is probably more common in warm climates, but nevertheless can be found in your own community. Pinworms, because of their simple life cycle, resistance of the egg stage to environmental conditions, physiological habits of the female worms and slackness in personal habits of the human race, are able to propagate and disperse themselves. The incidence percentage in the general population is 35 to 40 per cent and 37 to 54 per cent in children in the United States.

The life cycle of human pinworms is direct, in that no intermediate hosts are required and man is the only known natural host for *Enterobius vermicularis*. The adult male and female worms are attached to the mucosa of the large intestine. The pressure of the eggs on the esophagus of the female causes her to release her attachment and migrate out the anus to oviposit on the perianal region. The eggs when deposited are embryonated and are infective within a few hours. The crawling of the gravid female and deposition of eggs cause scratching and itching of the perianal region. Thus, the hands convey the mature eggs to the mouth. The larvae emerge from the egg shells in the lower bowel, molt twice and mature into adults. About four to seven weeks are required for ingestion of the mature egg to development of mature adult worms.

The adult spindle-shaped pinworms are round worms inhabiting the cecum and adjacent portions of the small and large intestines of man. The anterior end of both male and female adults is equipped with lateral cuticular expansions, the alae or "wings." The esophagus is characterized by a posterior bulbous and a prebulbar swelling. The adult males are seldom seen in the feces because of their small size 2 to 5 mm. in length by 0.1 to 0.2 mm. in diameter. The posterior end of the adult male is sharply curved. The adult female is larger than the male, measuring 8 to 13 mm. in length and 0.3 to 0.5 mm. in diameter. The caudal region of the female is distinctly attenuated. The eggs, averaging 55 by 26 u, contain a larva when passed and

* Read before A.S.M.T. Convention, June 7-9, 1948.

require only about 6 hours to mature. The thin hyaline shell is asymmetrical, being concave on one side and flattened on the opposite side.

Because of the migratory habits of the gravid female pinworm, the best method for the diagnosis is by the recovery of the eggs by means of an anal swab. Six swabs of the perianal region should be taken on consecutive days. The ideal time of swabbing is the first thing in the morning before bathing or defecation. If one member of the family is infested, all members should be examined. The National Institute of Health, N.I.H. anal swab[1] consists of a small square of cellophane held to the end of a glass rod with a rubber band. The prepared swab is inserted into a perforated rubber stopper and placed in a test tube. For examination the cellophane square is placed in a drop of saline or 0.1 N-NaOH on a glass slide. After applying a coverslip the low power objective is used for surveying and the high dry objective for verification of the eggs and possibly the adult female. Frosst and Company of Montreal[2] have modified the N.I.H. swab by gluing a small cellophane square to the end of a wooden applicator. The method of examination is similar to the N.I.H. swab.

A more recent anal swab devised by Graham[3] makes use of a piece of "Scotch Cellulose Tape." The Scotch tape, ½ inch wide and 8 inches long, is folded back on each end, adhesive surfaces together, for convenience in handling. While holding the ends with forceps the Scotch tape loop is patted on the perianal region. The ribbon of tape is placed lengthwise on a glass slide and examined under the microscope. In place of the forceps for holding the Scotch tape, a satisfactory practice has been to loop ¾ inch by 3 inch tape over the end of a 16 x 150 mm. test tube or a 20 x150 mm. tongue depressor.

In Scotch tape preparations the motililty of the larvae is lost in about 2 days and the larvae degenerate after 4 to 5 days leaving the characteristic asymmetrical, thin, hyaline shell. Certain artifacts may be found on the swab preparations which might be confusing to the beginner. Such artifacts do not contain larvae, may not be within the size range, 55 x 26 u, and may not be flattened on one side. Usually the diagnosis of pinworms does not have to rest on one egg. If pinworms are present, a systematic survey of enough anal swab preparations will demonstrate the characteristic eggs.

Repeated examinations of perianal material cannot be overemphasized. A summary by Sawitz, Odom and Lincicome[4] of the works of various authors, Table I, shows that the greater the number of examinations the higher the incidence percentage. The examination of 4 swabs on each patient by various workers gave 24-50 per cent more positive cases of pinworm than were

Table I—Increase in pinworm infections detected by repeated examinations of perianal material

AUTHOR	Year	Country	Means for Obtaining Perianal Material	Number of Individuals Examined	Incidence Percentage After the Following Numbers of Examinations							
					1	2	3	4	5	6	7	8
Skrjabin	1925	Soviet Russia	Match	(?) (children)	14.2	75.0	84.6	94.4				
Serbinow & Schulmann	1927	Soviet Russia	Match	71 (children)	10.9	26.7	46.5	52.1				
Serbinow & Schulmann	1927	Soviet Russia	Match	42 (children)	33.3	61.9	69.0					
Schulmann	1927	Soviet Russia	Match	117 (adults)	54.3	67.5	74.3	82.9	84.6			
Cram, Jones, Reardon & Nolan	1937	United States	NIH swab	49 (children & adults)	30.6	42.8	55.0	59.1				
Bozicevich & Brady	1938	United States	NIH swab	319 (children)	41.4	52.0	56.4	65.2				
Gill, Smith & McAlpine	1938	United States	NIH swab	637 (ages up to 70 years)	47.2	64.8[1]						
Sawitz, Odom & Lincicome	1938	United States	NIH swab	131 (children)	71.8	81.7	87.0	87.8	92.4	95.4	96.2	97.2

[1] A total of 64.8 percent infection was found. The number of examinations was not stated.
Sawitz, W., Odom, Vada L., and Lincicome, David R. Public Health Reports 54: 1148-1159, 1939.

diagnosed by just one swab. On the examination of 7 swabs 9 per cent more cases were diagnosed than by 4 swabs and 25 per cent more than with 1 swab.

Sawitz, Odom and Lincicome[4] also summarize the data of various workers, Table II, comparing the efficiency of the direct fecal examination, the brine and zinc sulfate centrifugal floatation techniques and the scraper or swab techniques for the detection of *E. vermicularis* eggs. "On the basis of the ratio calculated from the comparative findings of the workers cited in Table II, it may be concluded that for every six *Enterobius*-infected individuals detected by the perianal swab technique, few if any are found on direct film examination, one by the brine technique, and at least one by the zinc sulfate centrifugal-floatation technique."

If a gross examination of the surface of the stool fails to reveal the adult pinworms, the feces should be screened. Mix the stool with tap H_2O and strain through a 20 mesh sieve and finally through a 40 mesh sieve. The unstained adults will show the characteristic bulbular esophagus and attenuated or curved caudal region. Pinworm infections, as with other helminths, should not be diagnosed until either the egg or adults has been recovered.

The most common symptoms associated with enterobiasis are nocturnal anal pruritis, insomnia and nervousness. Picking of the nose, incoördination, convulsive seizures, loss of appetite, malnutrition and chronic appendicitis have also been associated with pinworm infection. The symptomatology depends on the degree of infection. Many infected children show no symptomatology.

Table II—Comparative efficiency of the direct fecal film, the brine and zinc sulfate centrifugal-floatation techniques, and the scraper or swab technique for the detection of *Enterobius* infection (based on incidenc percentage)

	Number Examined	Percent Positive with the Following Techniques				
		Direct Fecal Film	Brine	$ZnSO_4$	Single Scraper or Swab Examined	Calculated Ratios
Schmidt, 1914	25	12	.....	.....	100	.....
Skrjabin, 1925	.....	.....	3.5–12.0	.....	35.4—67.0	1:6.7
Serbinow and Schulmann, 1927	71 42 113	.....	3.5 0 2.2	.....	33.5 10.9 29.2	1:13.2
Bogojawlenski and Lewitzki, 1929	.....	.....	.....	.....	.....	1:5
Headlee, 1935	206	0	6.19	.....	35.16	0:1:6
Wright and Cram, 1937	102	.....	13.7	.....	100	1:7:3
Cram, Jones, Reardon, Nolan, 1937	62	.....	8.06	.....	64.52	1:8
Gill, Smith, McAlpine, 1938	637	.....	3.9	.....	47.7	1:12.3
Sawitz, Odom, Lincicome, 1938	131	.....	13.7	17.6	71.8	1:1.2:5.2

Sawitz, W., Odom, V. L. and Lincicome, D. R., Public Health Reports 54:1148-1159, 1939.

Personal hygiene is of extreme importance in preventing infection and reinfection with pinworms. The infected person should sleep alone, wear closed sleeping garments and possibly mittens to prevent scratching or contamination of the hands. The finger nails should be cut short and hands thoroughly washed after defecation and before meals. The sleeping garments should be boiled and the toilet washed frequently with cresol. Specific anthelmintic treatment should be administered and six post-treatment perianal swabs should be negative before considering the treatment successful.

In conclusion I should like to emphasize these points:

1. Pinworm infections are present in your own community.
2. The morphological characteristics of the adults are the anterior alae and bulbular esophagus. The egg is asymmetrical, thin shelled and embryonated.
3. The perianal swab should be used to recover the eggs and at least six examinations made.

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A NEW TECHNIQUE FOR ANAEROBIC CULTURE

By ARNOLD L. SWANCARA, A.B., *Tucson, Arizona*

The dearth of simple methods for the culturing of anaerobes is an all too frequent complaint among workers in this field. Schaub and Foley assert with some emphasis that due to troublesome and time consuming techniques the cultivation of anaerobes has been neglected.

The new method here described lends itself readily to practically all varieties of test tube culture work and particularly finds favor where sugar fermentation studies are desired in small laboratories. It utilizes the basic principles of oxygen exclusion devised by the most outstanding authorities in this line, including Buchner, J. H. Wright, Rosenthal and others. It may be used with solid media (slants) but it is with liquid media that it may be used with impunity, especially where Dunham's fermentation tubes are employed and that without danger of contamination of the culture.

Technique

The materials employed in this procedure are available in every laboratory so that no outlay for special apparatus is needed. These include: 6x¾ inch Pyrex culture tubes, tight fitting rubber stoppers, Dunham's fermentation tubes, 5 grain gelatin capsules packed with pyrogallic acid and a 30% solution of NaOH.

Solid media is appropriately slanted and liquid media is tubed in 6x¾ inch test tubes containing a Dunham fermentation tube, cotton plugged and sterilized in the usual manner. When ready for use the upper extrusion of the cotton plug is lopped off and the stub pressed down into the tube to a distance sufficient to afford ample space to house another Dunham's fermentation tube containing a capsule of pyrogallic acid. To this upper tube is added one cubic centimeter of a 30% solution of NaOH, the rubber stopper securely inserted and the entrapped contents are ready for incubation. (Figure 1).

Should it be desired to obtain a partial CO_2 tension such as is needed for the growth of Brucella or Neisseria, the upper Dunham tube is omitted and in its place a household match, broken in half with the detonating tip removed, is inserted and so placed that the ignition end leans against the wall of the tube. The rubber stopper is set in place and the side of the tube where the match head is leaning is heated in a flame until ignition is effected. The contents is now ready for the incubator. (Fig. II).

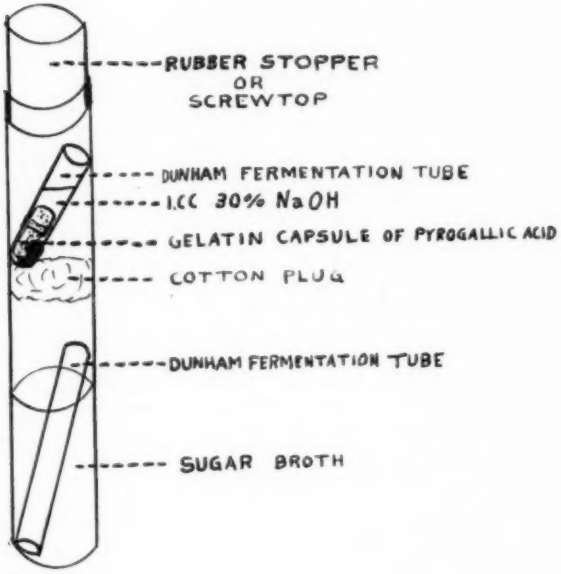
RUBBER STOPPER
OR
SCREWTOP
DUNHAM FERMENTATION TUBE
1.CC 30% NaOH
GELATIN CAPSULE OF PYROGALLIC ACID
COTTON PLUG
DUNHAM FERMENTATION TUBE
SUGAR BROTH

FIG. I.

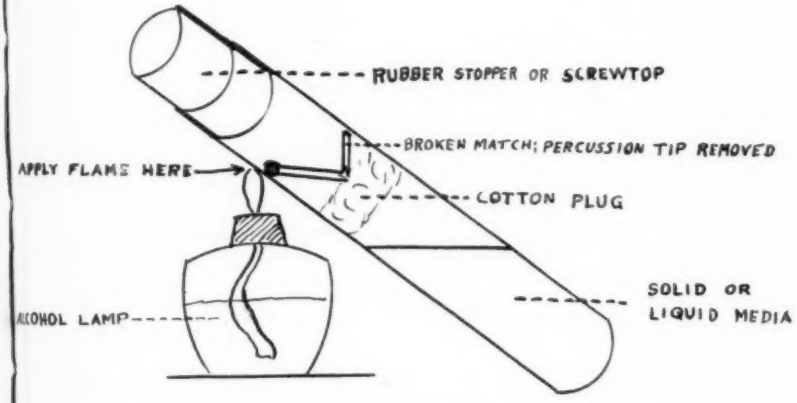
RUBBER STOPPER OR SCREWTOP
BROKEN MATCH; PERCUSSION TIP REMOVED
APPLY FLAME HERE
COTTON PLUG
SOLID OR
LIQUID MEDIA
ALCOHOL LAMP

FIG. II.

Summary and Conclusion

The aim of this procedure is primarily to simplify techniques of already existing principles as well as adding a new process of CO_2 tension formation. Literature was thoroughly searched and no duplicate of the procedure was discovered so that aside from modifying some of the older methods of anaerobic cultivation a new technique is here devised affording a wider and easier range of application of this work.

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THE ROLE OF THE TECHNOLOGIST IN THE DIAGNOSIS OF UTERINE CANCER*

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Early diagnosis of cancer is of vital interest to all members of the medical profession. Uterine cancer, in particular, because of its frequency and high mortality,[5] is of utmost importance. The discovery by Papanicolaou[15] that certain bizarre, exfoliated cells found in the vaginal smear were malignant, has opened a new field of investigation and constitutes a distinct advance[2] in the early diagnosis of uterine cancer. The original work published in 1928 described a method of preparing, fixing, staining and identifying cells in the vaginal smear.[15] The potentialities of the method failed to impress clinicians and Papanicolaou lost much of his enthusiasm.[16] However, Traut revived his interest, and together they published "Diagnosis of Uterine Cancer by the Vaginal Smear Method"[19] in 1943. Meigs [7, 12, 13, 14] and his co-workers were the first to confirm these findings and published two series of cases. Ayre, Jones and others also have made important contributions.[1-11]

The convincing evidence of this method of early recognition of malignant cells has resulted in the formation of Gyne-Cytology Laboratories in connection with Tumor Clinics, Diagnostic Centers and in certain large hospital laboratories. This simple, inexpensive, office procedure is in use in private practice today, smears being sent to Gyne-Cytology Laboratories for diagnosis. "The success or reliability of this method depends on the following: first, it is not recommended as a means of ultimate diagnosis, and second, it is a preliminary or screening procedure which should be followed by biopsy and tissue diagnosis[3]." The vaginal smear is not, as the name might suggest, a bacteriologic smear, but is, in reality, a cytologic smear, being either vaginal or cervical. In many ways, the use of the cytologic smear for the recognition of cancer, is analogous to the use of the blood smear in the diagnosis of diseases of the blood and blood-forming organs.[19] Patient and repeated search of numerous preparations by well trained cytologists is essential to success.

Papanicolaou has outlined a simple method for securing the vaginal secretion, which a technician, nurse or the patient may follow.[16] The patient should be instructed not to bathe or douche for several hours prior to the examination, since water dilutes the secretion and destroys cellular detail. Lubricants should not be used because they interfere with staining.

* Read before A.S.M.T. Convention, June, 1948

The vaginal secretion is obtained by aspirating it with a slightly curved, dry pipette, fitted with a rubber bulb. The bulb is compressed and the pipette inserted into the vagina as far as possible. The bulb is released and the pipette moved from side to side so that all parts are sampled. The secretion is blown from the pipette onto previously marked slides and spread with the convex side of the pipette or with a gloved finger. The resulting smear will necessarily be a thick preparation but it should be as uniform as possible.

Immediate fixation in a mixture of equal parts of 95% alcohol and ether is the next and most important step of the entire procedure. Good preservation of cells and proper staining are obtained by IMMEDIATE FIXATION. If the smears are allowed to air dry, the sharp definition of cells, the finer details of their nuclear structures and their staining affinities are greatly impaired. Complete immersion in the fixative from five to fifteen minutes is adequate, but several hours is not harmful. However, fixation prolonged one to two weeks, will cause the cells to lose their staining properties.

The staining procedure as used by Papanicolaou is long and involved, and detailed descriptions may be found in several publications. Aqueous hemotoxylin, alcoholic solution of orange G6 and combinations of several dyes in alcohol, designated as EA 25, EA 31 and EA 36, are the principal agents used in this procedure. The end result of this method is a multicolored smear, the advantages of which are:

1. Nuclei are well stained in the usual manner with hemotoxylin.
2. The cytoplasm stains differentially: the acidophilic portion varying from red to orange and basophilic staining green or blue-green.
3. Identification of the different types of cells is aided by this variability.
4. Blood and blood pigment, free or ingested, takes a characteristic orange or orange-green color.
5. Red blood cells and epithelial cells are more transparent and thus piled up cells are more readily distinguished.

Several modifications of the original technique have appeared in the subsequent literature.[3, 6, 10] Secretions are obtained directly from the cervical os and endocervical canal by combining the use of the pipette with the speculum. Cellular material may be obtained from surface lesions by means of a specially designed spatula. Ayre has further modified the technique by placing the material directly in the fixative and centrifugating.[6] The resulting sediment is then either smeared and stained in the usual manner or blocked in paraffin and treated as any tissue block.

These modifications serve only to complicate a method, the outstanding feature of which is simplicity. However, the advantages are concentration and stratification of cancer cells.

A detailed description of the diagnostic criteria is beyond the scope of this paper. Briefly, the cellular changes can be summed up in the following words: anisocytosis, anisonucleosis, multilobulation, multinucleation, pyknosis, hyperchromatism and marked variation in the nuclear-cytoplasmic ratio. The presence of blood or blood pigment is considered almost essential to a positive diagnosis. Histiocytes and leucocytes are usually present, but their significance is doubtful. It is important to remember that there is no single infallible sign of malignancy. The ability to diagnose malignancy in cells detached from tissue is a matter of experience in the variation of cells both normal and abnormal.[8]

"Diagnosis by means of the vaginal smear is a cytologic one and anyone with a good background in histology and cytology can be trained to be a satisfactory technician."[12] The screening process may be carried out by the technologist, who puts aside doubtful slides for the expert cytologist.[12] It is understood that a negative smear does not exclude the possibility of carcinoma, but presents strong evidence against it. The positive smear is presumptive evidence of cancer and must be followed by biopsy before any therapeutic measures are undertaken.

While the purpose of this paper has been to stress the importance of the cytology smear in the diagnosis of uterine cancer, attention should also be called to other possibilities. With some modifications, Papanicolaou has applied his method to urine, gastric aspirations and sputum and describes its efficacy in bronchogenic, gastric, bladder and renal cancer.[16] Hunter has further modified the technic to include bronchial mucus, rectal mucus, transudates and exudates.[10]. Any ulcerating lesion, so located that a direct surface smear is possible, can also be studied in this manner. Vaginal smears are being used to follow the progress of uterine cancer undergoing radiation therapy.[9] Hence, it seems to be only a matter of time, until this procedure will be added to the diagnostic armamentarium of many laboratories throughout the country.

CONCLUSIONS

1. The Vaginal Smear Method for the early presumptive diagnosis of cancer is an accepted laboratory procedure.
2. The final diagnosis of malignancy is the responsibility of the Cyto-Pathologist.
3. Technologists may carry out the original screening procedure.
4. Technologists screening smears must have special cytologic experience and training.

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Discussion of Paper

THE ROLE OF THE TECHOLOGIST IN THE DIAGNOSIS OF UTERINE CANCER

By PHYLLIS STANLEY, *Tumor Histologist, New Jersey State Dept. of Health*

I agree with the conclusions which Sister Mary Norbert has just presented, namely:

1. The Vaginal Smear Method for the early presumptive diagnosis of cancer is an accepted laboratory procedure.
2. The final diagnosis of malignancy is the responsibility of the Cyto-Pathologist.
3. Technologists may carry out the original screening procedure.
4. Technologists screening smears must have special cytologic experience and training.

I should like to emphasize a few of the details which Sr. Norbert mentioned. Dr. Papanicolaou says he did not discover any new criteria for the diagnosis of cancer. He has brought the subject of the diagnosis of cancer by the microscopic examination of exfoliated cells in vaginal secretions, urine, gastric contents, sputum and serous effusions to the foreground. He has made more people aware that this method is scientifically sound and that there are many possibilities of the diagnosis of cancer by this method. He has made more popular the examination by concentration of various secretions from organs other than the vagina. The method of concentration is very important in the diagnosis of cancer of the stomach from gastric washings, of cancer of the lung from sputum which was either coughed up or removed by bronchoscopic aspiration, of cancer of the prostate from prostatic secretions, of cancer of the bladder and kidney from urine, and also of cancer from various serous effusions.

Dr. Papanicolaou adapted the Masson stain, to be used on the smears which he was examining. We can now buy these stains already made up under the name of "Papanicolaou Stain." One of the important factors which Dr. Papanicolaou stresses is that the material must be fixed immediately, before the cells dry and have a chance to deteriorate. He suggests that the smears be placed immediately, before they have a chance to dry, in a jar with equal parts of 95 per cent alcohol and ether.

I presented a paper at the Fourth annual convention of this Society, at Excelsior Springs, in 1936, in which I discussed the preparation of transudates for histological study. It was a review of the technique we had been using for some time at the Presbyterian Hospital in Newark. We emphasized the point that the fluid should have a fixative added to it as soon as possible so that the cells would not deteriorate. The rest of the technique included centrifuging to form a block, dehydrating with alcohols and embedding in paraffin. At this

time we were also concentrating other secretions and preparing slides for Dr. S. A. Goldberg, the Pathologist, to examine for cancer cells. Dr. Goldberg reported his findings in a paper given before the American Society of Clinical Pathologists at their meeting in Chicago about 5 years ago. He found that a large percentage of the diagnoses of the fluids were substantiated at operation or autopsy. The staining method I suggested was H. & E. Today many pathologists are changing the staining of their smears from the Papanicolaou method and using H. & E. or Wright's stain. If the specimen is fixed immediately and does not dry, the method of staining is not vitally important. The large nuclei and nucleoli indicative of cancer can be differentiated by a trained eye in any well-stained slide. In the H. & E. stain, one cannot see the nuclear granules so well as with the Papanicolaou stain where there is a differentiation between the eosinophilic and basophilic cells. These were important in the determination of the menstrual phases; but in the differentiation of cervicitis from cancer the presence of bizarre cells the number and size of the nuclei and nucleoli and the presence of mitotic figures is to be considered. The value of the diagnosis by the smear method depends first upon the skill with which the material to be examined is collected. I do not know how many technologists assist in the taking of vaginal smears, but I imagine quite a number can have some influence in seeing that the smear is taken properly and fixed immediately. After being stained well, the correct interpretation of the findings requires experience and knowledge of cytology, particularly cancer cytology. I believe it is only by examining many smears, under supervision that one becomes proficient in identifying the cancer cells. There are so many different forms that suspicious cells may take, and so many unusual formations that non-malignant cells may take, that experience in looking at many is the best teacher. Dr. Papanicolaou divides his diagnosis into five grades. These are in the order that the presumption of the diagnosis of malignancy the slide appears to be. The most suspicious is grade V and have proved 95 per cent positive at biopsy, and grade I is the lowest or least suspicious. Taken at random from the population, statistics show 6 positive in 3,000 examinations. I should like to bring to your attention another method of the diagnosis of cancer which has been developed by Dr. Harry S. N. Greene of Yale. He makes a diagnosis of cancer by inoculating a small piece of tumor tissue into the anterior chamber of the eye of the rabbit. If the tumor grows, it is malignant. If it does not grow, it is not malignant. He has developed several types of transplants, namely heterologous, or from human to rabbit; homologous or from one individual to another in the same species, and autologus or transplant from one location in an individual to a different region in the same individual. The tissue from another species is transplanted into the rabbit and shows evidence of growth in about two weeks if it is a

malignant tumor. Perhaps in the future we technologists will be assisting in the diagnosis of cancer by this method.

The American Cancer Society has been doing a stupendous piece of work in educating the public and making them cancer conscious. Some of the doctors feel that they are tending to develop an even larger number of neurotic people, particularly women, by all the publicity which they are putting out in phamphlets, newspapers and magazines, regarding cancer of the cervix, its easy diagnosis and uring every woman over 35 to have a vaginal examination at least once a year. There is no doubt but we will pick up early cases by our smears, and that some later cases are brought into the clinic. I should like to consider a few statistics with you. There are about 45 million women in the U. S., of the age where uterine cancer can strike. A trained person can examine 3 smears per hour, 24 per day or 7,000 per year. It would take 6,000 trained persons to examine just the uterine smears. Perhaps this is a challenge to the Medical Technologist as we are the ones who stand in the foreground as the assistant to the cytologist, to aid in doing the screening test. It must be remembered that a negative test does not mean anything. It may give the patient a false sense of security.

RECENT OBSERVATIONS IN THE SEROLOGY OF SYPHILIS

By MARGARET ZWALLY, M.A., *USPH Service, Staten Island, N.Y.*

As I remember, it was in 1942, in St. Louis, that I talked with you about the evaluation of serodiagnostic methods for syphilis. It is pleasing, indeed, to be invited again to tell the American Society of Medical Technologists something of the current work in the serology of syphilis.

Among the many interesting subjects which could be discussed, I have chosen three. They are: First, evaluation studies; second, quantitative serology; and third, cardiolipin antigens.

In order that we may start from common ground in our discussion, I shall review briefly the history of organized studies. There are two general types—one, those designed to evaluate the efficiency of the methods themselves; the other, those designed to evaluate the efficiency of performance of the several methods in hands other than the originators'.

Evaluation studies which aim to determine the reliability of test procedures may be organized on a comprehensive basis, using a very diverse clinical material, or they may be organized to determine just how a given test, or several tests, respond to one disease entity. These so-called original-method evaluation studies were held in Copenhagen in 1922 and 1928; in Montevideo in 1932. A modified study, under the auspices of the U. S. Public Health Service and the American Society of Clinical Pathologists, was conducted in 1934 and 1935. The last comprehensive study of this type was the Washington Serology Conference in 1941.

During this quarter century many similar studies have been carried out in an effort to improve serologic methods; usually to make them more specific or at least to determine the limit of their non-specificity in diseases such as leprosy, malaria, tuberculosis, mononucleosis, etc. The end result of these original-method investigations has been to improve serologic methods by pointing out their weaknesses, which, in turn, has led to abandonment of the methods or to modifications which increase their usefulness. Another result has been the general increase in sensitivity of all serologic methods.

The studies and conferences by the originators of the many serologic procedures have demonstrated the willingness and ability of a varied group of research workers to get together, to discuss, and to cooperate in the solution of the over-all problem.

A committee of representatives from the U. S. Public Health Service and the American Society of Clinical Pathologists was responsible for the initiation of nation-wide, annual evaluation studies to determine the relative efficiency of performance in the state laboratories. The first of such studies was held in 1935-36. The twelfth one

has just been completed. Participation by the state laboratories has been excellent. Most surveys have included all state laboratories. during the first few years of the evaluation work, gross inefficiencies were demonstrated. Some of the laboratories reported as high as 10 per cent positives on completely normal donors. Others operated the methods in such a way that as high as 22 per cent doubtfuls was recorded among the normal donors. The percentage of positives found among syphilitic donors ranged from approximately 25 to 85 per cent on the same group of specimens. The answer to these gross discrepancies was found to lie partly in the variations, modifications, and departures from standard techniques, although all results were reported by a given test name. Within the 12-year period, each state laboratory has shown that it is capable of performing at least one standard serologic test in a satisfactory manner. It is hoped that this is an indication of the routine work and not a presentation of the results of special effort on the few specimens distributed during the survey. In addition to the recognized improvement of performance of serologic methods within the state laboratories themselves, the evaluation idea has spread to the state organizations. Many states conduct periodic intrastate studies and are able to measure the improvement among the laboratories within the states as they progress from year to year. The evaluation studies have been a means of education since they have informed the serologists of what has been needed to improve their own performance, and since the clinician who uses the results of the laboratory has been made aware of just how far he can rely upon the laboratory.

At this time we are confronted with the possibility that the annual evaluation studies of efficiency may need revision. It begins to look as though they have proved that there is a limit to the reproducibility, to the adaptability, to the uniformity of results which can be obtained by a given test when performed by several serologists. In other words, there is some indication that we have had our goal too high. The effect of common antigens on uniformity of results will be discussed in relation to the antigens containing cardiolipin.

The idea of determining the end-point of reactivity of syphilitic serum is not new, but it was not until the advent of rapid treatment of syphilis that its great usefulness was appreciated by other than a few clinicians and laboratorians. Since the serologic pattern resulting from antisyphilitic therapy can be used to indicate the need for additional treatment or re-treatment, it becomes most important that end-point reactivity be determined on all post treatment specimens. Quantitation can be a factor in diagnosis, particularly if only one or two tests are performed. The introduction of penicillin in the treatment of syphilis re-emphasized the need for quantitative serology. The few efforts to survey the performance of quantitative methods have not yielded results showing the desired uniformity. There are such wide variations in the titers reported that it would be difficult indeed for a

physician to correlate the findings of one laboratory with that of another in order to establish a serologic picture of the results of treatment.

Among the several reasons for discrepancies in titer can be mentioned the fact that quantitation starts at many levels of reactivity. Slight differences in technique account for other variations, and the diverse manners of reporting quantitative results is very confusing.

A very important point so far as the physician is concerned is the fact that the same method is not performed on the quantitative basis by the several laboratories which he uses. Much labor is needed to improve the performance of quantitative serologic methods in order that it compare favorably with that of the qualitative or diagnostic procedures.

In a science which is so empirical as serology, any suggestion that a fairly constant factor could be introduced would be hailed with optimism. Such was the case of Doctor Pangborn's announcement that she had isolated, in relatively pure form, an active lipoid. In the seven years in which her cardiolipin has been studied, we have a few inconclusive conclusions to present. In specimens from syphilitic donors, antigens using cardiolipin and lecithin, as an essential accompanist, have demonstrated comparable reliability with the old lipoidal antigens. Essentially the same methods can be used to control the sensitivity of test set-ups employing two kinds of antigens. There is some evidence that test procedures using cardiolipin lecithin antigens may result in fewer positive reactions among nonsyphilitic malarial patients. An interesting finding is that the new antigen may also result in eliminating some of the atypical, confusing results among certain population groups. These findings have been observed among some of the Indian tribes of southwestern United States, Mexico, and Central America.

At the present time there is under way a cooperative study from which a huge mass of data is being accumulated. Many state laboratories are contributing the findings of parallel testing with cardiolipin and crude lipoidal antigens. A preliminary analysis of the data and an effort to correlate the results of the parallel testing with the results of the annual evaluation studies lead us to believe that cardiolipin lecithin antigens are not removing many of the vagaries of serology. Since the cardiolipin antigen for each test in this study is common for all participants, we may also conclude that the antigens are not the major cause for multiplicity of results. There are other problems which must be tackled, but there is no doubt that cardiolipin itself gives us the first constant in a field of variables from which we may hope to destroy the empiricism of serologic tests for syphilis.

In summary, future improvement in the serodiagnosis of syphilis will probably lie in the acceptance of the pure chemical compound as the basic component of antigens, whether it be synthetically prepared

or merely extracted from the usual sources; and upon a meeting of minds concerning the level of reactivity of all test procedures in an effort to lessen the zone of doubtful, hence confusing, reactivity. It will be helpful if all serologists can begin to report the end results of quantitative procedures in terms of dilution or some other one manner.

There will probably be changes in the organization of the annual evaluation studies in an effort to determine if present-day methods can be depended upon to yield more uniform results than have been obtained in the past.

WELCOMING ADDRESS*

By THOMAS B. MAGATH, M. D.,

Division of Clinical Laboratories, Mayo Clinic, Rochester, Minnesota

It is with genuine pleasure that I welcome you, members of the American Society of Medical Technologists, to the Mayo Clinic and Rochester, Minnesota. We have looked forward for a long time to having you with us and we hope that your stay here will be thoroughly enjoyable. We hope in your stay here you will have an opportunity to get at least a bird's eye view of the laboratories and what we are trying to accomplish in them. We, like most other places, are terribly crowded and it is difficult for us to perform our routine work in the space which is allotted to us. We are in the act of correcting this now by a building program which we trust will give adequate laboratory space for the enormous amount of work which we have to carry on.

In the division of the laboratories of which I am director, it is necessary for us to turn out nearly 900,000 tests a year. In addition to this we have a great deal of investigative work to do and a heavy teaching program in relation to our fellowship men who are candidates for advanced degrees from the Graduate School of the University of Minnesota. In order to carry out this vast amount of technical work, it is necessary for us to keep a large staff of technicians. As a matter of fact, at this time we have more than 200 technicians working in the various laboratories which have to do with the study of material obtained from patients.

Never in the history of medicine has the demand for adequately trained laboratory technologists been so great. The field has grown enormously since the days when the American Society of Clinical Pathologists sponsored the registry of medical technologists. The desire and the demand for laboratory work has grown enormously during the past decade and, in most localities, it has been impossible to keep up with it, primarily because of the lack of medical technologists to fill the positions in the laboratories. Whenever the demand for any craft, trade or profession becomes great, there is always a tendency to let the standards down. This is one of the prices which frequently has to be paid for apparent progress. However, if true progress is to be made in the fields of the laboratory, it will be necessary to maintain high standards for laboratory technicians.

On the other hand it should be apparent that there are numerous jobs to be done in the laboratory which do not require the high technical skill which is so much in demand for technicians

* Read at the meeting of the ASMT, Rochester, Minnesota, June 9, 1948.

who are going to perform intricate tests or to assist in investigative work and teaching in the laboratory. There are also many tasks in the laboratory for which it is a definite disadvantage to employ a highly trained person. Concerning the field of the technician with little formal training, therefore, it is important to think correctly and work out a proper solution. A girl who has spent a considerable amount of time and a large amount of money in perfecting herself in medical technology should not be expected to do the minor routine tests in a laboratory and the girls who are going to do these tests should not be required to spend their money and time in studies which will not be of any particular benefit to them. One may quibble over this point and say that individuals with little formal training are not really medical technologists and, therefore, should not come under the jurisdiction of the American Society of Clinical Pathologists and its registry. Perhaps it will be possible to separate these two groups sharply into a junior and senior group. If this were done, it might solve a great number of the problems which are now confronting laboratories.

One of the worst problems in the laboratory is the rapid turnover of medical technologists. As long as there is an excess of positions for the available help, it is obvious that technologists are going to move about to gain the most lucrative and the best positions they can. This, however, is very difficult from the laboratory standpoint and means a constant turnover of personnel, an inefficient laboratory and one which is likely to return results which are not reliable. One of the greatest desires and needs in the laboratory today is for a stable personnel which can be properly trained and will properly execute the tests. This is a difficult social and economic problem. The vast majority of medical technologists are young women. They are susceptible not only to the desires of moving about all over the country and trying their strength in new positions but there is always a certain tendency on the part of these girls to become married and to leave the positions for which they have been trained. This state of affairs is unavoidable and, indeed, from the standpoint of the public, it should be considered highly desirable. On the other hand, it does give the director of a laboratory the very serious problem of giving adequate laboratory service to physicians and patients who have become dependent on the laboratory in the past decade or so.

There are then three major problems which confront laboratories from the standpoint of technical help. The first is the necessity of finding an adequate number of well-trained girls to go into the laboratory and to replace or to fill jobs made vacant for various reasons. Second, there is the necessity for separating laboratory technologists into two distinct groups,

those who are thoroughly trained and experienced and who can act as supervisors and assistant supervisors, and those who can do the similar types of tests under supervision and do them reliably. Lastly, there is the need for stabilization of laboratory personnel so that laboratories can carry on from day to day and from month to month without impairing the efficiency or the accuracy of the reports which are returned to the physician. I do not know the answer to any of these problems but I am sure that they are important and that they should command the attention of your society which after all is in a large measure responsible for the effectiveness of the medical laboratories in the United States and Canada today.

THE GOOD TECHNOLOGIST*

By ARTHUR HAWLEY SANFORD, M.D.,

Division of Clinical Laboratories, Mayo Clinic, Rochester, Minnesota

It is a pleasure to welcome you to Rochester. We hope that your visit may not only be pleasant but may be somewhat enlightening. Unfortunately, it is not possible to show a large group much of what is really going on, nor could any one person expect to see everything in the time at your disposal.

I have chosen a very trite subject to talk about in the few minutes allotted to me. I am often asked to make an appraisal of the qualifications of some particular medical technologist. The query really means, is she a good technologist, and do you recommend her for employment? The questions may be printed in the form of a questionnaire and are usually quite specific and sometimes are very obscure. Such questions are usually to be answered (or checked in appropriate squares) on the basis of grading from "poor" up to "excellent" about some particular qualification, and usually there is quite a list of these various queries. I have come to the conclusion that the attributes that really make for efficiency in the good medical technologist may be summarized under three simple headings.

The first of these attributes, I believe, is good health. The familiar Latin phrase *"mens sana in corpore sano"* (a sound mind in a sound body) certainly applies to the good technologist. Good eye sight is of primary importance. I am always interested when an applicant wears glasses. I usually ask to see them and make up my mind whether she has a very bad error in refraction. It is difficult for a girl with poor eyesight to be a good microscopist. However, an error in refraction may be accommodated for by the lenses of a microscope. Another attribute regarding

* Read at the meeting of the ASMT, Rochester, Minnesota, June 9, 1948.

her physical characteristics is undoubtedly, manual dexterity. There are no aptitude tests that are really simple enough to bring out this point, although I have often wished that there had been devised some aptitude test, such as fitting pins in holes in a board, or some such similar simple test. I have used in times past the vocational aptitude test, developed by the University of Minnesota, for clerical workers. This is simply an exercise in matching names and numbers. I do not know that there is any correlation between a good score and good work as a medical technologist. However, often matching names and numbers is an important part of the technologist's work in an institution such as the Mayo Clinic, where material is labeled by serial number and also by name. By good health, of course, I also mean that the candidate is not "sickly," and is not going to take an unreasonable amount of time away from her regular duties on account of ill health, nor is she going to drive herself to do work when she does not feel well and perhaps actually ruin her health.

The next necessary attribute is experience. Experience, of course, must be based upon sound and thorough fundamental education. All of the requirements that have been laid down by the Registry for Medical Technologists of the American Society of Clinical Pathologists are probably necessary. However, at times a girl without adequate preliminary education does develop into a very good technician, especially for routine work. In addition to adequate preliminary education, of course, it is desirable to have adequate training. There again the training varies depending upon the institution in which it has been obtained. Often a laboratory director may feel that a girl is better qualified for her particular job if she has been trained on the apprentice basis in his own laboratory under the supervision of some well-experienced technician. But real experience that is acquired by the repetition and correct performance of the same procedure so many times that it becomes second nature to do things accurately, is the attribute that is to be desired in the good technologist. The Irishman who said, "Don't go near the water until you are an expert swimmer," must have had some such experience in mind. I remember a "Hibernianism" of Dr. W. J. Mayo in his advice to the young surgeon. He would state, "Do not attempt to do a cholecystectomy until you have taken out a hundred gallbladders."

The third attribute is honesty. We all know what honesty means and yet I think there are different characteristics that could be grouped under this general term. Perhaps what I really mean is loyalty. First might be mentioned loyalty to one's employer, or to the laboratory director. There should be no attempt at "face saving" by not admitting lack of knowledge of

certain technics. This can be offset by eagerness to learn new methods. Next, I think, is loyalty to your colleagues—loyalty to the technologist that works next to you. Do not do those things that make it easy for you but hard for her. But above all loyalty to one's self leads to what I mean by true honesty. The ability to work alone is one of the most important attributes in the good technologist. Trustworthiness, faithfulness and loyalty to the institution, or employer; but also loyalty to one's self, resulting in knowledge that the work has been performed correctly; willingness to tell frankly the person who is receiving the report that it may be best to do the test over or that there is some discrepancy as regards that particular report; on the other hand if the technic has been correct, a report of the result, exactly as found, regardless of seeming nonconformity to a preconceived probability—all of these things add up to this one attribute of honesty.

And so in conclusion, to you, who by your presence at this convention show your desire and purpose to be known as good medical technologists, I would imitate St. Paul's admonition in his first epistle to the Corinthians: And now abideth health, experience and honesty, these three, but the greatest of these is honesty.

ABSTRACTS

STUDY OF FIXED TISSUE SECTIONS OF STERNAL BONE MARROW OBTAINED BY NEEDLE ASPIRATION. By Austin S. Weisberger, M. D. and Robert W. Heinle, M. D. (from Department of Medicine, Western Reserve Medical School, Cleveland, Ohio). AM. J. Med. Sci. 215, 170 (February) 1948.

"The first small drop of marrow obtained is expelled upon a glass slide and used to make several smears. One cc of material is then aspirated and placed in a bottle containing 0.2 cc Wintrobe anticoagulant which has been evaporated to dryness." (1.2 gm ammonium oxalate and 0.8 gm potassium oxalate per 100 ml distilled water).

"A nucleated cell count is made and the aspirated material then transferred to a hematocrit tube. The tube is centrifuged at 2500 revolutions per minute for 20 minutes to obtain the volumetric pattern which consists of the myeloid-erythroid layer, fat, red blood corpuscle and plasma content.

After removing blood from the anticoagulant tube, gross marrow particles are seen to adhere to the sides of the tube. These particles can be washed down with plasma with a Wintrobe transfer pipette, and then transferred to a small tube which is then placed in an ice box (4°C) for 10-30 minutes. This allows the particles to aggregate, usually on the top but occasionally on the bottom. The surplus plasma is carefully removed with a Wintrobe pipette. The smallest amount of plasma necessary to suspend the particles is allowed to remain. One drop of 0.25 M calcium chloride is added to the tube to clot the plasma. An excess of calcium chloride inhibits coagulation and it may be necessary to employ a drop of thromboplastin to bring about clotting. The resulting clot with the marrow particles is placed in Zenker's acetic fixative for 30 minutes to one hour, and is then rinsed briefly in tap water. The material is then transferred to 50% alcohol and subsequently dehydrated in 60, 70, 85, 95% and absolute alcohol and finally in xylene. This marrow material is allowed to remain in each alcohol solution for about one hour and in the xylene for about 45 minutes. The authors state that it is all right to leave the preparation in 85% alcohol overnight. Three changes are made within each hour beginning with 95% alcohol. It is then infiltrated with paraffin containing about 2% beeswax; three changes of this mixture being employed within a period of 2½ to 3 hours. It is embedded, and cut at 4 mu in serial sections. Staining is accomplished by Harris hematoxylin and eosin.

THE ESTIMATION OF URETHANE (ETHYL CARBAMATE) IN BLOOD By H. E. Archer, L. Chapman, Eva Rhoden and F. L. Warren. Biochem. Jour. 42, 58, 1948.

Urethane ($NH_2.COOC_2H_5$) is quantitatively hydrolyzed to ethanol, ammonia, and carbonate by boiling with sodium hydroxide solution. Ethanol is estimated by distillation into acid potassium dichromate solution followed by titration of excess dichromate with sodium thiosulphate after addition of potassium iodide. The estimation involves two stages: 1. Determination of volatile reducing substances in blood before alkaline hydrolysis.

"Folin-Wu blood filtrate (10 ml) is measured into a 100 ml flask containing a few glass beads and connected with a Jackson's condenser which has its delivery tube extended downwards for about 15 cm. The delivery tube dips below the surface of a mixture of potassium dichromate and sulphuric acid (1 ml of 0.1 N $K_2Cr_2O_7$ and 5 ml A. R. conc H_2SO_4) which is contained in a tube of 20 ml capacity. The tube containing the mixture is well cooled in ice. With no water cooling on the condenser, about 8 ml of the flask's contents is distilled over into the oxidizing mixture. A glass stopper is sealed into the tube with a drop of concentrated H_2SO_4 and the contents mixed and heated to 80° for 20 minutes. The tube is then cooled and the contents washed into a flask with about 100 ml of water, 5 ml of 5% KI solution are added and the liberated iodine titrated with o.1N-Sodium thiosulphate.

The above determination usually yields a small blank value. 2. Determination of volatile reducing substances after alkaline hydrolysis.

"A clean flask is fitted to the condenser, and a mixture of 10 ml of blood filtrate together with 5 ml of 10 N NaOH is refluxed for 15 minutes. The water supply to the condenser is then stopped and 8-10 ml of the flask's contents distilled into acid dichromate mixture as in (1). The subsequent procedure is as described in (1) above.

"The difference between the dichromate reduced in (1) and in (2) is a measure of the urethane content of the blood. 1 ml of 0.1 N dichromate is equivalent to 2.225 mg urethane."

The authors state that it is necessary to carry out the procedure in two stages and suggest heparin as a satisfactory anticoagulant. Normally the blank value ranges 3-5 mg %. However, care must be taken that the patient is given no other drugs that can be hydrolyzed, nor must the blood be preserved with such a substance.

The authors felt that a necessity arose, when urethane was

adopted for the treatment of leukemia, for a method for the estimation of this drug.

A METHOD FOR ESTIMATING PEPTIC ACTIVITY IN GASTRIC CONTENTS by J. N. Hunt, Guy's Hospital Medical School, London, S. E. L. Biochem. Jour. 42, 104, 1948.

Method.

The Substrate

"**General remarks**: Dehydrated human plasma and serum, rejected as unfit for human use have been used exclusively for this work. The dried plasma or serum is of variable color and freely soluble in distilled water.

"**The substrate solution**: Substrate solution is made up to contain 5.6 g. dried citrated plasma or dried serum in 100 ml of distilled water with sufficient t HCl to give an acidity of pH 2.1 as determined with a glass electrode at 18-22°. The substrate is stirred and then filtered through a Green's 309¼ Agar filter paper or cotton wool. Considerable variations in the rate of filtration have been encountered but this had no apparent significance in the method.

Other reagents required—

0.350 N-trichloracetic acid (approximately 6 g/100 ml)
0.250N NaOH
pH 2.1 HCl solution
Folin and Ciocalteu's (1927) phenol reagent
Phenol solution (5.Omg/100 ml) freshly prepared

PROCEDURE

"The sample of gastric juice under examination is mixed with an equal volume of dilute HCl of pH 2.1. A series of pairs of test tubes, one tube containing 5.0 ml of substrate and the other 10.0 ml of trichloracetic acid are placed in a water bath at 35°. Stock tubes of gastric juice mixtures are also warmed in the water bath. After 20 minutes 1.0 ml of gastric juice mixture is added to the substrate tubes of pairs 1, 3, 5, et seq. and to the trichloracetic acid tubes of pairs 2, 4, 6, et seq. Each addition is made at regular intervals so that a series of up to 15 estimations can be handled in 14 minutes. Mixing is insured by agitation of the tubes outside the water bath. Thus peptic digestion proceeds in the substrate tubes of the odd-numbered pairs whilst the even pairs provide controls.

"Exactly 15 minutes after the addition of gastric juice to any pairs of tubes, their contents are mixed by pouring back and forth. This stops any digestion in the odd-numbered pairs. After

mixing the tubes are allowed to stand in the water bath for approximately 4 min. The mixture is filtered through a 15 cm paper (Whatman No. 1.) 15-30 minutes after the beginning of filtration 2.0 ml of the filtrate are pipetted into a 50 ml flask containing 20 ml 0.25 n-NaOh and thorough mixing is ensured by swirling (vigorous shaking must be avoided as it tends to reduce the development of color). Forthwith 1.0 ml of Folin & Ciocalteu's phenol reagent is run down the side of the flask and mixed by immediate swirling.

"A blue color gradually develops and 15-40 minutes later it is estimated in a photoelectric colorimeter with a suitable filter. A single cell colorimeter (King 1946) with an Ilford 204 filter has been found satisfactory.

"A gastric juice is said to have 50 units of peptic activity/ml when under the standard conditions of estimation (viz. after dilution with an equal part of HCl solution of pH 2.1) it gives a color equivalent to that produced by 2.0 ml of a standard phenol solution (5.0 mg/100 ml.).

"The standard color is developed by mixing 2.0 ml of freshly prepared phenol solution (5.0 mg/100 with 20.0 ml 0.25 n-NaOH and promptly adding 1.0 ml of Folin and Ciocalteu's phenol reagent. Between 5-10 minutes later the color is read in the colorimeter. A blank estimation is made omitting the phenol; in this way ten consecutive estimations gave values, after subtracting the blanks, of 0.51 with no measureable deviations. The method may be used in any laboratory by determining the color given by the standard reagents with 2 ml phenol solution (5.0 gm/100 ml.)* If the optical density be C, then before reading the peptic activity from the curve, all colorimeter readings must be corrected by a factor C/0.51 since the graph is plotted for our equivalent of the standard, viz 0.51 optical density.

The relationship between the difference in color between control and test and the peptic activity of the gastric juice can be plotted from the values shown in the Author's Table No. 1 by plotting the curve on logarithmic paper.

The authors state that a new relationship between peptic activity and color would have to be established for fresh plasma. Also any alteration of the substrate beyond the range of 5-6 gm/100 ml would require a modification in the strength of the trichloracetic acid. Optimal pH is necessary for the maximal development of color.

TABLE 1. Relation of peptic activity of gastric juice to difference in color between control and test.

Pepsin Units	Optical density (Ex100) (Dif. between control & test)	Pepsin Units	Optical density (Ex100) (Dif. between control & test)
10	15.0	100	71.4
15	21.0	110	75.0
20	27.0	120	78.0
25	32.0	130	81.0
30	36.8	140	83.5
35	41.0	150	86.2
40	44.5	160	89.0
45	48.0	180	94.0
50	51.0	200	98.7
60	56.0	220	103.0
70	60.5	240	107.2
80	64.5	260	111.5
90	68.0	280	115.0
		300	118.0

* 5.0 gm/100 is exact figure but abstractor questions if correct.

IN THE LAND OF THE SKY BLUE WATERS

CLARA M. BECTON, MT (ASCP)

Early Sunday afternoon, on July 6, 1948, members and guests of the American Society of Medical Technologists enthusiastically formed a long line before the 30 foot registration desk in the lobby of the Hotel St. Paul. At 3:30 chartered Twin Cities busses arrived at the hotel entrance and several hundred guests had an enlightening tour of St. Paul and Minneapolis.

That evening an informal reception held by the Minnesota Society of Medical Technologists honored the officers, members, and guests who had an opportunity to visit the technical and scientific exhibits.

On Monday evening a Smörgasbord dinner was arranged. A group of Scandinavian dancers in costume provided a delightful series of folk dances. Dr. Kano Ikeda spoke at length on the growth of the national society and its development along with the Board of Registry.

On Tuesday a new feature was added to the traditional luncheon held on the second convention day. A style show was given by the Field Schlict Company. The favorable comments on this affair were such that a style show with the luncheon could be recommended as a tradition for the future.

Seldom does one see a community in which the chief industry is the one big business of the diagnosis and treatment of disease. On Wednesday it was the privilege of some 400 technologists to get a glimpse of the world renowned Mayo Clinic at Rochester, Minnesota. Although there were many reverberations in respect to what we did not see, it must be accredited to Mayo's that we did receive a true birds-eye picture of the general plan for "processing" patients. The wealth of scientific material presented at the A.S.M.T. convention and our informal visit to the vast clinic leaves us with the desire that the Minnesota Medical Technologists invite us back for a convention sponsored by the Mayo Foundation.

For sixteen years the annual banquet has been the highlight of the convention. This year's was no exception—except in that it was THE banquet of all our sixteen years. More than 250 persons attended the dinner which was cleverly presided over by Dr. E. L. Tuohy. Among the guests of honor were the Queen and the Prime Minister of the Winter Carnival, who presented Miss Frieda Claussen with a scroll proclaiming her the "Baroness of 'Beekers'" for her meritorious efforts in arranging the convention. Unusually delightful entertainment was provided by two young acrobats in Indian costume and by a trio of Indian

Drum Majorettes who put on a spectacular performance of drill routines. Miss Jeanne Bartl, a young coloratura soprano, thrilled her listeners with "By the Waters of Minnetonka" and Dell Agua's "Villanelle." A group of student medical technologists from the Chas. T. Miller Hospital of St. Paul presented a most realistic skit with nearly every problem confronting the profession and did it in the manner of those who had truly suffered. Forty states (38 of which have affiliated societies) and the Dominion of Canada answered the roll call.

The awards were presented as follows:

First Paper: "A Suitable Substrate for the Determination of Pancreatic Lipase in Serum and other Body Fluids," by Miss Elizabeth Maclay, Mayo Clinic, Rochester, Minnesota.

Second Paper: "Positive Cephalin-Cholesterol Flocculation Test in X-Ray Workers," by Mrs. Nell Butler, Seale Harris Clinic, Birmingham, Alabama.

Third Paper: "Sources of Error in Common Clinical Procedures," by Mrs. Nobuko Mizuno, Charles T. Miller Hospital, St. Paul, Minnesota.

Honorable Mention: "Semen Analysis from the Angle of the Clinical Laboratory," by Miss Edith Damgaard, 1926 Banks Ave., Superior, Wisconsin.

First Exhibit (Individual): "Unusual Urinary Cellular Elements Related to Heavy Metal Therapy," by Mary Frances James, University of Alabama, Birmingham, Alabama.

Honorable Mention: "Methods of Washing Laboratory Glassware," by Bernice Elliott, Omaha, Neb.

First Exhibit (State Society): Colorado Society of Medical Technologists.

Honorable Mention: Minnesota Society of Medical Technologists, Fifth District.

The new officers were introduced and thus ended our sixteenth annual convention.

YOUR RESPONSIBILITY

With the new requirement of reciprocal state and national membership in our professional organizations, we are setting out this new fiscal year to one of greater expansion and membership. With our present membership of slightly over 3200, we must each set ourselves the goal of two new members in order to add to our forces the remainder of the 11,000 registered medical technologists. Whether or not you attended this just past annual convention, you have a responsibility to your national society, and to your profession.

Let us review some of the facts and figures relating to our organization: on July 1, 1944, we had 667 members; now we have 3245; at our convention in June 1944, there were 29 delegates and officers representing eighteen states; this year there were 141 delegates and officers representing 38 states. Fifteen new state societies were affiliated with A.S.M.T. in the year from July 1, 1947 through June 30, 1948. Our president, Mrs. Lucille Wallace, fortunately was able and was willing to make the tremendous effort necessary to visit several states where she assisted in the organization of a number of societies. Misses Ida Reilly and Mary Eichman also assisted in the organization of a number of new state societies. Sister M. Alcuin Arens organized a splendid program which marks signal progress in this organization of ours in that, she says, "In 1948 cooperation has reached such an extent within A.S.M.T. that not one speaker appeared by proxy on the program, not one presiding officer nor alternate remained at home, not a single committee, local or national, failed to function. That marks progress."

Altogether, our organization is growing. While not all of us can inspire a group to band together in organization, nor can we all present a program that far outshines any presented previously, nor can we all be leaders; but there is not one of us who cannot at least BELONG to our professional organizations. Who knows what potential lies hidden in the person who hasn't troubled to apply for membership in his state and national professional organizations? Yes, it is your responsibility—and mine—to bring every registered medical technologist into his state and national societies of Medical Technologists.

—R. M.

CONVENTION HIGHLIGHTS

St. Paul, Minnesota, June 7, 8, and 9, 1948

With a total registration of 505, of whom some 360-odd were members of the organization, and the remainder students of medical technology, doctors, and exhibitors, the American Society of Medical Technologists held its sixteenth annual convention in St. Paul, Minnesota. Thirty eight states and Canada were represented in the meeting of the House of Delegates which had an attendance of 130 delegates, 10 members of the Board of Directors, and the Executive Secretary.

Miss Tate reported a membership of 3245 in the A.S.M.T., an increase of approximately 900 since June 30, 1947. Fifteen of the state societies represented had been affiliated since that date.

Mrs. Lucille Wallace reported the following recommendations of the Board of Directors (meeting held June 5, 1948) and of the Advisory Council (meeting held June 6, 1948):

1. That the problem of placement service be handled by the individual state societies and that possible employers be advised that they may advertise in the "American Journal of Medical Technology" as a nominal rate.

2. That the Canadian Society of Laboratory Technologists be advised that their group will be accepted as an affiliate of the A.S.M.T. provided their constitution and by-laws meet the requirements of the A.S.M.T.

3. That the Board of Registry be requested that the title to be given any lower classification of laboratory workers not contain the words "medical technologist" or "medical technician," but that such classification be "laboratory aide" or "laboratory helper."

4. That the Board of Registry be requested to discontinue the circulation of the fourteenth edition of the Registry information pamphlet which contains the words, "Medical Technologist, Junior Grade."

5. That a representative of the National Retirement Fund be given an opportunity to present a retirement pension plan for hospital employees to the House of Delegates. (The representative was unable to attend.)

6. That Miss Cecelia Korteum be requested to accept the Chairmanship of the Commercial Exhibits Committee for another two years and that she be allowed 10% of the net proceeds from the exhibits as compensation for her efforts. (This recommendation was amended to the effect that succeeding Commercial Exhibits Chairmen be appointed for three year periods.)

7. That the services of a qualified parliamentarian be secured for the meeting of the House of Delegates.

8. That the matter of "displaced persons" be referred to the individual state societies for consideration as the Board feels its inadequacy to pass judgment in such cases.

9. That the Executive Secretary be authorized so to reword the certificates of membership and the state charters that they will conform to the Articles of Incorporation and By-laws.

10. That the A.SM.T. cooperate with UNESCO if invited to participate in any of the activities of the latter organization.

11. That the matter of state licensing be referred to the Legislative Committee for study during the coming year, and that there be a report on the results of such studies at the time of the next annual meeting.

12. That the Executive Secretary be instructed to write to the Corporation Commissions of each state and the District of Columbia in order to ascertain whether or not there are groups of medical laboratory workers incorporated therein, and also to ascertain the requirements for such incorporation.

All the above matters had been referred to the Board of Directors and to the Advisory Council by members of the A.S.M.T. The House of Delegates acted upon each as was fitting.

The suggested budget for 1948-49 as presented by the Finance Committee was as follows:

Stamp Fund		$ 600.00
Printing		600.00
Office Equipment		500.00
Travel Expenses of Officers, Executive Secretary, and Journal Editor		1400.00
Monthly Expenses of Officers		180.00
Committee Fund		1325.00
Roster, 1949		500.00
Reprints		100.00
Exhibits		50.00
Executive Office		4800.00
Miss Tate, Executive Secretary	$ 75.00	
Miss Willett, Secretary	225.00	
Typist, part time	50.00	
Petty Cash	25.00	
Rent	25.00	
Monthly total	$400.00	
JOURNAL at $1.50 per capita		4500.00
Auditing		150.00
Bonds, Executive Secretary and Treasurer		50.00
Fourth Edition of Information Pamphlets		200.00
Insurance, Office Equipment		30.00

Detroit Attorney	25.00
Awards	200.00
Expenses of Officers or Representatives to meetings and Conferences	400.00
	$15,610.00

The budget was accepted by the House of Delegates.

The proposed changes in the Constitution and By-laws (as printed in the AMERICAN JOURNAL OF MEDICAL TECHNOLOGY, Vol. 14, No. 2, March 1948) will make Article VIII, Section 1 of the Constitution, read: "The membership of this Society shall consist of two general classes: (a) Active members who shall be members in good standing of a subordinate Medical Technologists' Society of a state, or District of Columbia, or territory of the United States or of a foreign nation and which Society holds a charter from this Society and is itself in good standing. All members of this Society who do not become a member of such a subordinate Society of the place of their residence or employment within one year after the adoption of the amendment of these Articles of Incorporation shall forfeit their membership in this Society, *unless the Board of Directors rules in individual cases that unusual circumstances justify extending membership in this Society to an individual without requiring that he become a member of the subordinate society of his place of residence or employment.* Only persons who are of good moral character and either (1) hold a certificate from and are in good standing with the Board of Registry of the American Society of Clinical Pathologists or (2) possess a degree at *least at* a master's level from an accredited college in any one of the six major fields of Medical Technology, viz: biochemistry, bacteriology, parasitology, histology, hematology, and serology, and have one year's experience in a clinical laboratory approved by any member of the American Society of Clinical Pathologists shall be eligible to be active members. Only active members shall be eligible to *vote or hold office.*"

Discussion of this amendment brought out the point that it was designed primarily to permit retention of membership in A.S.M.T. by those persons whose unusual circumstances of residence or employment make membership in a subordinate society impossible. It will also clarify the point that persons with a degree higher than that at a master's level will be eligible for membership under the conditions stated.

The proposed amendment reducing this requirement to a degree at a baccalaureate level was defeated.

The By-laws were amended as follows:

Article 1, Section 1, will now read: "Subordinate Societies shall be formed as specified in the Constitution of this Society after approval of its application as provided in Article XI. It

shall, if unincorporated, submit its proposed Constitution and By-Laws *and a list of all charter members and officers by name and address to the Executive Secretary. A charter shall be issued to the subordinate society after unanimous approval by the Constitution and By-Laws Committee of this Society of the Proposed Articles of Incorporation, Constitution and By-Laws, and approval of the membership list by the Executive Secretary. Any proposed Articles of Incorporation, Constitution or By-Laws not unanimously approved by the Constitution and By-Laws Committee shall be submitted to the Board of Directors; and if approved by a majority of the Directors a charter shall be issued."*

To Article II, Section 2, was added, *"Subordinate Societies may grant active membership only to those members who also become members of this Society."*

This amendment was discussed at some length due to the fact that it might be construed that too much pressure was being brought to bear by the national society. However, in those states where such was already in effect, the result seems to be a decided increase in membership.

To Article IX, Section 2, was added, *"The chairman of each committee shall be appointed by the president for a term of one year. Any chairman may be reappointed provided the total term as chairman and committeeman does not exceed three years."*

Discussion of this question brought out the point that a worthy chairman could be reappointed for the whole period of his membership on a committee, while such a ruling would permit the appointment of another individual in case a chairman failed to accept his responsibilities.

To Article IX was added Section 14: *"Members of committees shall be permitted to attend the meeting of the House of Delegates and participate in discussions. Unless they are accredited delegates from a subordinate society they shall have no vote."*

This amendment provides for the participation in matters relating to their activities by members of committees (as A.S.M.T. members) whether or not they are representing any specific state as a delegate. The point was brought out here that those states without a duly affiliated society will hereafter not have a voice in the House of Delegates.

The following persons were elected to office: President-elect: Miss Ida Reilly, Roanoke, Va.; Recording Secretary: Miss Vernal Johnson, Oklahoma City, Okla.; Treasurer: Miss Loretta Laughlin, Benson, Minn.; Board of Directors: Miss Mary J. Nix, Portland, Oregon, and Miss Louise Vance, Elmhurst, Illinois.

The invitation to convene in Roanoke, Virginia, in 1949 was accepted. It was decided to plan for a four day convention in

order to permit more time for the meetings of the House of Delegates and Advisory Council.

Other matters accepted by the House of Delegates were:

1. That standing committee reports be brief and that they be mimeographed for distribution to the delegates at the beginning of the session.

2. That a qualified parliamentarian be engaged for all meetings of the House of Delegates.

3. That galley proofs of all articles submitted for publication in the Journal be sent directly from the printer to the author for correction.

4. That a committee be appointed at the request of the delegates from New Jersey to investigate working conditions, hours, and salaries in that state with the purpose of bringing pressure to bear to improve the same.

At the meeting of the new Board of Directors on June 8, 1948, the following matters were considered:

1. Investigation of cost of printing a new Roster. This will include the names of *all members in good standing by Jan. 1, 1949.*

2. Confirmation by the Board of the name of Mrs. Lucille Wallace as an Advisory Editor of the AMERICAN JOURNAL OF MEDICAL TECHNOLOGY to take the place of Dr. Philip Hillkowitz (deceased).

3. Expression of the opinion of the House of Delegates parliamentarian to the effect that minutes of a meeting cannot be printed in full until they have been approved by the official body. Therefore a delay of at least one year would ensue if the minutes would be printed in full in the JOURNAL. For this reason it would be deemed advisable to print an unofficial narrative resumé of the convention activities.

4. Authorization of the Executive Office to compile and distribute transfer forms for distribution to the state societies for their members desiring same.

5. The editor was instructed to revise the "Information Pamphlet" for distribution to possible new members.

78 SISTERS WHO ATTENDED THE 16th ANNUAL CONVENTION OF THE AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS. They represented 24 Sisterhoods from 20 states, Washington, D.C., and Canada.

THE NEW MEXICO SOCIETY OF MEDICAL TECHNOLOGISTS AT ITS ORGANIZATION MEETING, April 18, 1948

ANNOUNCEMENTS

Roster (1949)

A complete Roster containing the names and addresses of all members in good standing of the American Society of Medical Technologists will be published shortly after January 1, 1949. Be sure that your dues are paid and that your correct name and address are in the hands of the Executive Secretary, Medical Center Building, Lafayette, Louisiana, by that date. All new members prior to that date will be included. Supplementary Rosters will be included in the JOURNAL when space permits.

Dues Payable Now!

All dues for the American Society of Medical Technologists will be paid through your state societies. If you do not belong to your state society already, write to the individuals listed on pages 249-253 of this issue of the JOURNAL for information, or write to a member of the Membership Committee as listed.

Placement Service

Individual doctors or hospitals desiring medical technologists may advertise in the AMERICAN JOURNAL OF MEDICAL TECHNOLOGY at the cost of $5.00 for a single issue advertisement. This will give our readers the service at no additional cost to themselves. It is suggested that state societies provide placement service for their members.

A.S.M.T. Exhibit

The American Society of Medical Technologists has an exhibit which is available for conventions of medical technologists, hospitals, or medical associations. This may be applied for through the Executive Secretary, Medical Center Building, Lafayette, Louisiana.

Subscription Price

The subscription price of the AMERICAN JOURNAL OF MEDICAL TECHNOLOGY to individual subscribers will be increased to $4.00 in the U.S. and Canada, and to $4.50 for countries outside the postal union; to $1.50 for single copies of back issues and $8.00 per volume when ordered through an agency. A.S.M.T. members will be charged $1.00 per copy for back issues when they order directly from the Executive Office.

Reprints

Reprints of the article "Chemical Reactions", A.J.M.T., Vol. 14, No. 3, May 1948, by Doris Wallace, are available at a cost of $0.10 each, from the Executive Office, Medical Center Bldg., Lafayette, Louisiana.

STANDING COMMITTEES

MEMBERSHIP: Miss Jeanne Jorgenson, 900 Modoc St., Berkeley 7, California, Chairman; Miss Edna Luneke, 428 North College, Grand Rapids, Michigan; Lucille Godelfer, 2928 Bell St., New Orleans, La.; Ida Reilly, Roanoke Hospital Association, Roanoke, Va.; Winogene McIntyre, St. Johns, Washington; Sr. Charles Miriam Strassell, St. Joseph's Hospital, Albuquerque, New Mexico.

CONSTITUTION AND BY-LAWS: Mr. L. B. Soucy, 805 West 8th St., Plainview, Texas; Katherine Dean, Baltimore, Maryland; Kathleen Knippel, 3 College St., Montgomery, Alabama; Allyne Lawless, Denver, Colorado; Alice Daniel, Martinez, California; Sylvia Anderson, Milwaukee, Wisconsin.

NOMINATIONS AND ELECTIONS: Henrietta Lyle, Maple Manor, RD #2, Columbia, Penna.; Gladys Jacobs, Bay City, Michigan; Eunice Reinhardt, Springfield, Illinois; Clara Kruse, Oakland, Iowa; Hazel Current, Santa Monica, California; Frieda Claussen, St. Paul, Minnesota.

STANDARDS AND STUDIES: Mollie Hill, 2325 37th St., N.W., Washington 7, D.C.; Margaret Brown, Pueblo, Colorado; Barbara Isbell, San Diego, Cal.; Charlotte Taw, Pittsburgh, Penna.; Doris Boone, Charleston, West Virginia; Sr. M. Dolorosa, St. Louis, Mo.

RESEARCH: Forrest W. Cross, Field Study Section—T.B. Control Division, U.S. Public Health Service, Bethesda 14, Md.; Hazel Suessenguth, Cleveland, Ohio; Elizabeth O'Toole, Denver, Colorado; Joyce Humphery, St. Louis, Missouri; Dorothy Hitchcock, East Lansing, Michigan; Hartzell G. Payne, Terre Haute, Indiana.

SERVICE FUND AND FINANCE: Loretta Laughlin, 315 N. 11th St. Benson, Minn.; Bernice Elliott, Omaha, Nebraska; Mary Eichman, Philadelphia, Penna.; Louise Vance, Elmhurst, Illinois; Oscar Stewart, Tulsa, Oklahoma; John Hannon, Gallipolis, Ohio.

LEGISLATION: Vernal Johnson, 1115 Medical Arts Bldg., Oklahoma City, Okla.; Evelyn Jardine, Hanover, New Hampshire; Vondell Stewart, Houston, Texas; Grace Marck, Salem, Oregon; Wilbert Zimmer, Grace Mary Ederer, Minneapolis, Minnesota.

EDUCATION: Sister M. Antonia Klapheke, Georgetown Hospital, Washington, D.C.; Joy Holm, New Orleans, Louisiana; Rose Hackman, Denver, Colorado; Mary Pottner, Salt Lake City, Utah; Mary F. James, Birmingham, Alabama; Estelle Downer, Milwaukee, Wisconsin.

SPECIAL COMMITTEES

CONVENTION (1949) GENERAL ARRANGEMENTS: Ida Reilly, Roanoke Hospital Association, Roanoke, Va.

PROGRAM: Mary Eichman, 440 Lyceum Avenue, Philadelphia 28, Penna.; Evelyn Ballou, 4105 Third St., N.W., Washington 11, D.C.; Joy Austin, University of Virginia, Charlottesville, Va.; Elizabeth Frey, 678 William St., Buffalo, New York; Betty Love, Apt. 2-B, 501 Thompson St., Charleston, W. Virginia.

AWARDS: Nell Butler, 2219 Highland Ave., Birmingham 5, Alabama; Dr. Riser, Dr. Sunderman, Mrs. Eleanor Stackhaus, Abington Memorial Hospital, Abington, Penna.; Sr. M. Eugene Carpe, Cincinnati, Ohio.

STATE SOCIETIES

ALABAMA: Membership Chairman: Mary Frances James, 812 South 20th St., Birmingham.

ARIZONA: Sr. Charles Miriam Strassell, St. Joseph's Hospital, Albuquerque.

ARKANSAS: Pres. Mrs. Rosemary Wright, Davis Hospital, Pine Bluff;
Vice-Pres. Mrs. Louise Sadler, 1305 West 25th St., Pine Bluff;
Secretary: Joyce Ponder, 1009 Park, Little Rock; Membership Chairman: Lila L. Church, 2116 Orange St., North Little Rock.

CALIFORNIA: Pres. Martha A. Lee, 14239 Victory Blvd., Van Nuys;
President-Elect: Barbara Isbell, Vet. Admin. Reg. Office, 325 "B" St., San Diego 1.
Secretary: Hazel Current, 918 - 17th St., Santa Monica.
Treas.: Amelia Clark, 1232 - 16th St. Apt. 103, Santa Monica.
Membership Chairman: Jeanne Jorgenson, 900 Modoc St., Berkeley 7.

COLORADO: Pres. Lavina White, Clinical Laboratories of C.W. Maynard, M.D., Pueblo.
Pres.-elect: Virginia Weir, 1104 Republic Bldg., Denver 2.
Secretary: Mary Fox, 661 Monroe, Denver 6.
Treasurer: Rose Hackman, 4200 E. 9th St., Denver 7.
Membership Chairman: Loretto Hamilton, 516 Republic Bldg., Denver.

CONNECTICUT: President: Florence Pease, Box "W", Newtown.
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Secretary: Lydia Brownhill, Meriden Hospital, Meriden.
Treasurer: Eleanor Hapgood, Stamford Hospital, Stamford.
Membership Chairman: Bertha Diem, St. Francis Hospital, Hartford.

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Mrs. Evelyn G. Scott, 4 Champlain, Bellemoor.

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Pres.-elect: Mary Sproul, 2434 Pennsylvania Ave., N.W., Washington 7.
Secretary: Francis Spear,
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ILLINOIS: President: Cecelia Korteum, 1164 N. Dearborn, Chicago 10.
President-elect: Ellen Skirmont, 5493 South Cornell, Chicago 15.
Secretary: Helen Gurley, Mt. Sinai Hospital, Chicago.
Treasurer: Marie McCoy, Holy Cross Hospital, 2700 West 69th St., Chicago 29.
Membership Chairman: Marie McCoy—see above.

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Vice President: Agnes A. Wagoner, 3630 N. Meridian, Indianapolis.
Secretary: Constance Padden, 3630 N. Meridian, Indianapolis.
Treasurer: Mr. Willis Overton, 1334 Ringold, Indianapolis 3.

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Secretary: Eleanor Amberg, Broadlawns Gen. Hospital, 18th & Hickman Road, Des Moines.
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Vice President: Mrs. Marjorie Kaufman, 230 N. Glenn, Wichita 12.
Secretary: Eileen Ebel, Box 15, Hillsboro.
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Membership Chairman: Dorothy Dickinson, Box 1368, Alexandria.

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Mr. Edward P. Walker, 206 E. 32nd St., Baltimore 18.

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Vice-President: Miss Betty Brockland, 4945-A Sutherland Ave., St. Louis.
Secretary: Miss Frances Moore, 825 Charles, St. Joseph.
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Secretary: Miss Jane Wilkins, Veterans Hospital, Albuquerque.
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Secretary: Mrs. Kathleen Shaw, Bay Ridge Hospital, 437 Ovington Ave., Brooklyn 9.
Treasurer: Mr. Charles Leiper, 506 Dartmouth Ave., Buffalo.
Executive Secretary: Sr. M. Marcella Barry, 565 Abbott Road, Buffalo 20.

NORTH CAROLINA: President: Sara Hodges, Memorial Hospital, Charlotte.
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Secretary: Ruth I. Meissner, 201 Churchill Drive, Fayetteville.
Treasurer: Clara B. New, Veterans' Hospital, Fayetteville.
Membership Chairman: Ruth I. Meissner (see above).

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Secretary: Mrs. Gladys Liles, Hillcrest Hospital, Tulsa.
Treasurer: Anne Adwan, 1115 Medical Arts Bldg., Oklahoma City.

OREGON: President: Agnes Marie Lyman, 4015 S.E. 30th Ave., Portland 2.
President-elect: Elsa R. Thompson, 7609 S.W. 33rd Ave., Portland 1.
Secretary: Betsy Baptist, 211 North West 21st, Portland 9.
Treasurer: Rose Angela DiLoreto, 3328 S.E. 52nd Ave., Portland 6.

PENNSYLVANIA: President: Helen Breen, 426 East Phil Ellena St., Philadelphia 19.
President-elect: Alvina Thompson, 149 Dana St., Wilkes-Barre.
Recording Secretary: Mrs. Mary E. Foldes, 511 Hazelton Nat. Bank Bldg., Hazelton.
Corres. Secretary: Elizabeth Heck, 958 North 5th St., Philadelphia 23.
Treasurer: Kathryn Simmons, 806 Summit Ave., Prospect Park.

RHODE ISLAND: Membership Chairman: Ruth F. Thomson, The Memorial Hospital, Pawtucket.

SOUTH CAROLINA: Ida Reilly, Roanoke Hospital Association, Roanoke, Virginia.

SOUTH DAKOTA: President: Sister M. Veronica, St. Luke's Hospital, Aberdeen.
Vice-President: Mr. Harry Falconer, City Health Lab., Sioux Falls.
Sec'y-Treas.: Sister Mary Mildred, St. Joseph's Hospital, Mitchell.

TENNESSEE: Membership Chairman: Olive Renfro, 1909 West End, Nashville.

TEXAS: President: Lucile Harris, Hendrick Memorial Hospital, Abilene.
President-elect: Phyllis Shaw, Santa Rosa Hospital, San Antonio.
Secretary: Frances Kelly, Gondolf Laboratory, Norwood Bldg., Austin.
Treasurer: Ruth Guy, Wm. Buchanan Blood Plasma & Serum Center, Baylor Hospital, Dallas.
Membership Chairman: Genevieve Buhrer, 4713 Junius St., Dallas 1.

UTAH: President: Katherine Dean, St. Benedict's Hospital, Ogden.
President-elect: Adrie E. Langan, St. Benedict's Hospital, Ogden.
Secretary: Marguerite George, Holy Cross Hospital, Salt Lake City.
Treasurer: Winona V. Simonson, 1453 Vintah Circle, Salt Lake City.

VERMONT: Membership Chairman: Ida Reilly, Roanoke Hospital Association, Roanoke, Virginia.

VIRGINIA: President: Harriet Howe, Rt. 13, Box 29, Richmond 21.
President-elect: Eleanor Rawls, 800 Wainwright Bldg., Norfolk 10.
Recording Secretary & Treasurer: Claire Hulcher, 4004 Hermitage Road, Richmond 22.
Corresponding Secretary: Mrs. Frances Crouch, 1405 Hillcrest Ave., Roanoke.
Membership Chairman: Mary Lenore Vinson, 6323 Ridgeway Road, Richmond 21.

WASHINGTON: President: Neva Lyness Johns, 401 Security Bldg., Olympia.
Vice-president: Mrs. Eugene S. Schneider, Tacoma General Hospital, Tacoma.
Secretary: Edna B. Wilcox, c/o Tenino Lumber Co., Tenino.
Treasurer: Marjorie Moss, 7711 Forest Drive, Seattle.

WEST VIRGINIA: President: Doris E. Boon, Charleston.
Vice-President: Mrs. Lena Huffman, Huntington.
Secretary: Constance Peterkin, Parkersburg.
Treasurer: Dorothy Crawford, St. Albans.

WISCONSIN: President: Dorothy Zoeller, 711 N. 16th St., Milwaukee.
President-elect: Grace Ballard, 925 N. 13th St., Milwaukee.
Secretary: Margaret Foley, 2039 W. State St., Milwaukee.
Treasurer: Mrs. Margaret Brei, 8435 Kenyon Ave., Milwaukee 13.
Membership Chairman: Grace Ballard (see above).

WYOMING: President: Mrs. Georgia O. Schmidt, 1915 Rollins Ave., Cheyenne.
President-elect: Patricia Gerlack, Torrington.
Secretary: Billie Kennedy, 320 S. 6th St., Laramie.
Treasurer: Mrs. Hilda B. Jowett, 3119 Hynds Blvd., Cheyenne.

TERRITORIES & FOREIGN: Jeanne Jorgenson, 900 Modoc St., Berkeley 7, California.

If you are a member of A.S.M.T. and have not yet joined one of the above organizations or an affiliated state society, write for an application blank. These may be obtained from the A.S.M.T. Executive Office, Medical Center Bldg., Lafayette, Louisiana, or from the Membership Chairman and state secretaries as listed. American Society Members of the unorganized states should make known their interest in organizing a state society. This can be accomplished through the Membership Counsellor as listed for the respective states.

STATE AND LOCAL SOCIETIES*

COLORADO: Society of Medical Technologists: 13th Annual Convention held on May 23, 1948, in Denver. Colorado Springs S.M.T. organized October, 1947: Membership 15: Monthly scientific meetings. Secretary: Sister M. Cypriana, St. Francis Hospital & Sanitarium, Colorado Springs.

MICHIGAN: Society of Medical Technologists: Annual Convention held April 24, 1948, Detroit.

MINNESOTA: Arrowhead Society of Medical Technologists: Annual meeting held May 20, 1948, Duluth. Secretary: Mrs. Mary Lou Janda.

MISSOURI: Society of Medical Technologists: Annual Convention held May 16, 1948, with 55 persons present. Fall meeting to be held in October, 1948, Kansas City.

NEW YORK: Society of Medical Technologists: First Annual Seminar held May 8, 1948, N.Y.C. Metropolitan New York Society of Medical Technologists: Next meeting September 11, 1948, St. Clare's Hospital, 415 West 51st St., N.Y.C., N.Y. Corresponding Sec'y: Mrs. Kathryn A. Griffin, 36-26 215th Place, Bayside, N.Y.; Recording Sec'y: Grace Quinto, 220 East 18th St., Brooklyn 26, N.Y.

OHIO: Society of Medical Technologists: Annual Convention held April 6, 1948, Columbus.

VIRGINIA: Society of Medical Technologists: First Annual Convention held May 1 and 2, 1948, Ocean View, Va. Next Annual Convention to be held on the first Saturday in May, 1949, at the Hotel Roanoke, Roanoke, Va. Corresponding Sec'y: Mrs. Frances Henry Crouch, 1405 Hillcrest Ave., Roanoke, Va.

*We regret that more space cannot be given to details of programs from the various state and local societies, but we would like to have you continue to send these to us. Because of somewhat limited space, we shall print first the dates of future state meetings, names of officers of state societies (see pages 249-253, this issue), names of secretaries of local organizations, dates of local meetings where feasible, and other details of state and local meetings whenever possible. Ed.